JUL 26 1924

VOL. 51 JULY, 1924 NO.

BULLETIN

OF THE

TORREY BOTANICAL CLUB

Editor

HERBERT McKENZIE DEWOLOW

Associate Editors

Albert Francis Blakeslee — George T. Hastings
Alexander W. Evans — Marshall Avery Howe
Henry Allan Gleason — Mildred Levine
Alfred Gundersen — Arlow Burdette Stout

CONTENTS

Across the Sonoran Desert..... FOREST SHREVE 203
Miscellaneous notes on plants of Southern California..... 2-
PHILIP A. MUNZ AND IVAN M. JOHNSTON 223
Studies in the genus Lespinasia—II. Some new names and combinations..... CHARLES PIPER SMITH 261
INDEX TO AMERICAN BOTANICAL LITERATURE..... 311

PUBLISHED FOR THE CLUB

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.

Entered at the Post Office at Lancaster, Pa., as second-class matter.

THE INTELLIGENCER PRINTING CO.
LANCASTER, PA.

PRINTERS AND BINDERS OF

Technical and Scientific

Books and Periodicals

ESTIMATES FURNISHED

TORREYA

A bimonthly journal of botany

Articles on the local flora, non-technical accounts of common plants of all groups, botanical notes, book reviews, etc.

Published by the Torrey Botanical Club at $1.00 a year. Address the treasurer,

MISS MARY LEE MANN,
171 Union Street, Flushing, N. Y.

LABORATORY SUPPLIES

OF EVERY DESCRIPTION

MICROSCOPES AND ACCESSORIES

Slides, Coverglasses, Stains, Glassware, Etc.

A well assorted stock always on hand

MEYER CAMERA & INSTRUMENT CO., Inc.
60 Third Avenue NEW YORK

Please mention the "Bulletin" when answering advertisements.

Vol. 51 No. 7

BULLETIN

OF THE

TORREY BOTANICAL CLUB

JULY, 1924

Across the Sonoran Desert

FORREST SHREVE

The type of desert so well known in southwestern Arizona extends southward into the Mexican state of Sonora for about 300 miles with relatively slight changes in the general physiognomy of the vegetation and in the local distribution of the plant communities. This natural province, which may well be termed the Sonoran Desert, is bounded on the north on the southern edge of the Colorado Plateau, in central Arizona, on the east by the Sierra Madre Occidental, and on the west by the Colorado River and the Gulf of California. To the southward it merges, at first gradually and then rapidly, into the xerophytic tropical thorn-forest which is characteristic of the west coast of Mexico south of Cape Corrientes. Many plants characteristic of the Sonoran Desert extend to the west of the Colorado River and thence northward, and many of them occur in Lower California and in the more elevated desert regions of Chihuahua and Coahuila. Considered as a whole, however, the Sonoran Desert is a very distinct area with respect to its plant life. In the variety of its plant communities, the relatively large number of species of striking growth-form, and in the abundance of succulents, it is very distinct from the Colorado and Mojave Deserts and from the deserts of Chihuahua and Coahuila.

The distinctive character and relative luxuriance of the Sonoran Desert may be attributed to the occurrence of biseasonal rainfall. Many of its characteristic plants fail to range into the Californian region of low rainfall confined to the winter and spring. The mountain barriers to the north and east offer adjacent territory with higher rainfall, but they also present

[The BULLETIN for June (**51**: 225-282) was issued July 12, 1924.]

conditions of lower temperature into which the desert forms are unable to move. To the south the slightly greater rainfall and the much higher temperature conditions are responsible for a distinct type of vegetation in which only a few of the Sonoran forms are represented. The precipitation is least along the western edge of the desert and increases with altitude toward the east, ranging from about 4 inches to about 16 inches. The temperature conditions in the northern part of the Sonoran Desert are such that at Phoenix and Tucson frost occurs several times every winter, but a freezing temperature never persists throughout the day. At Guaymas freezing temperatures are unknown.

The vegetation of the northern portion of the Sonoran Desert has been described and illustrated by several writers,* with particular reference to the Tucson region. It is the purpose of this paper to describe some of the salient features of the vegetation as observed in an expedition from the Desert Laboratory, at Tucson, to the shores of the Gulf of California at a point half way between Guaymas and the mouth of the Colorado River. This trip was made by automobile in November, 1923, immediately following the first of the winter rains. The course lay southwest from Tucson to the International Boundary, which was crossed at El Sasabe, thence south to Altar, west to Pitiquito, and then south and west to the shores of the Gulf at Libertad, thence southward to Punto Kino. The return was made by essentially the same route.

It happens that the International Boundary between El Paso and Yuma lies very close to the divide separating the drainages which run northward into the Gila River and those that flow south and southwest into the Gulf of California. The approach to El Sasabe from the north lies across the grassy plain known as the Baboquivari Valley. The entry into Mexico is made among low hills at an elevation of 3500 ft. Another extensive grassy plain is then traversed, falling gradually south and east to the Rio Seco. The coarse, granitic loam of this plain supports only

* MacDougal, D. T. Botanical Features of North American Deserts. Pub. 99, Carnegie Inst. Washn., 1908. Hornaday, W. T. Camp Fires on Desert and Lava. New York, Scribners, 1908. Spalding, V. M. Distribution and Movements of Desert Plants, Pub. 113, Carnegie Inst. Washn., 1909.

a cover of annual and perennial summer-growing grasses, with very infrequent individuals of *Prosopis* and *Opuntia*. The elevation is too high for *Covillea*, *Parkinsonia* and *Carnegiea*, although all of these species are found in the hills near the Boundary, at a slightly higher elevation. This anomaly, which is common in many other localities, may be explained by the greater insolation and warmer soil of the south-facing slopes of the hills.

On reaching the foot of the plain at San Rafael Ranch the road follows the flood plain of the Rio Seco nearly all the way to Altar. The vegetation of this region is essentially identical with that of the flood plains near Tucson, and the new species that appear in it are not so striking as the new ecological habits exhibited by some of the familiar plants. For example, *Encelia farinosa*, a composite shrub which is confined to rocky slopes and coarse outwash in the Tucson region, always in company with other plants, may here be seen in extensive pure stands on alluvial soil. Two conspicuous cacti are first seen a few miles south of San Rafael, *Lophocereus Schottii* and *Lemaireocereus Thurberi*. These are both columnar forms with branches from 4 to 6 inches in thickness, which rise in groups of 5 to 25 and attain a height of 4 to 10 feet. Both of these plants are found in Arizona, but their northernmost outposts are naturally to be found on south slopes in sheltered positions. *Lophocereus* is first seen in the Rio Seco valley on alluvial and outwash soil, and is most commonly found in such situations throughout its range. *Lemaireocereus* is first seen on the hills that skirt the valley and its occurrence in general is confined to rocky slopes and coarse outwash.

The Rio Seco is a tributary of the Altar River, which it reaches in a number of small channels after spreading out into an alluvial delta 10 miles in width. The town of Altar is at one corner of the delta and the town of Pitiquito near the other. These old settlements are both on the Altar River, and between them this stream is joined by the Magdalena, or San Ignacio River, which drains an extensive area of hilly country in the District of Nogales. The narrow streets of these towns are lined with unbroken rows of stuccoed and tastefully tinted adobe houses, with no hint of lawn, fence or porch. The streets and the mud-walled gardens of pomegranates, oleanders, oranges and date

palms give the traveler the impression of being in some Moroccan village, far from the confines of the United States.

Throughout northern Sonora the vegetation of the flood-plains and alluvial areas is more nearly like that of southern Arizona than is the vegetation of the hills and the outwash slopes or "mesas." The "Little Peaklet" from which the town of Pitiquito derives its name is the first place that the cardon, *Pachycereus Pringlei*, is detected. This is an arborescent form similar to *Carnegiea* but more massive and unlike it both in its

FIG. 1. Characteristic vegetation between Pitiquito and the Picu Mountains, Sonora. The trees are *Parkinsonia*, *Olneya*, and *Prosopis*. The cactus is *Lophocereus Schottii*.

coarser armature and in the more acute angle of insertion of its branches. *Pachycereus* grows here together with *Carnegiea* and *Lemaireocereus*, and the abundant *Opuntia Bigelovii*, making a landscape that would arrest the attention of any traveler.

After crossing the broad bed of the Magdalena River the remainder of the journey to the Gulf is across small valleys with unimportant streamways and small ranges of volcanic hills. Between Pitiquito and the Sierra Picu, the last range of hills crossed, the course lies between 1100 and 2000 ft. in elevation.

On the coarse, gravelly mesas the characteristic plants are chiefly species of wide distribution in the Sonoran Desert, such as *Covillea tridentata*, *Parkinsonia microphylla*, *Olneya tesota*,

Carnegiea gigantea, *Acacia paucispina*, *Opuntia fulgida* and *Fouquiera splendens*. In the vicinity of Tucson *Olneya* is confined to the warmest situations, sheltered south exposures which are not subject to the influence of cold air drainage. In the valleys between Pitiquito and Libertad it is much more ubiquitous, and occurs abundantly in situations where cold air drainage operates to produce minimum temperatures that are considerably below those of the upper slopes and foothills of each valley. The behavior of *Carnegiea* remains unchanged, however. In the Tucson region it is much more abundant on the south slopes of hills than on the north, and this is true of it down to the point at which it begins to be infrequent and to yield its place in the landscape to *Pachycereus*. The latter cactus in turn, and also *Lemaireocereus*, are like *Carnegiea* in exhibiting greater abundance on south slopes than on north ones.

Parkinsonia microphylla and *Cercidium Torreyanum* are both abundant down to the Gulf, showing no change in their habitat. *Parkinsonia aculeata*, which is widely cultivated throughout the southern United States, is first seen within 60 miles of Tucson. It is nowhere a common tree but occurs singly or in small groups at widely separated localities.

The Arizona shittimwood, *Bumelia rigida*, is a tree known only from four localities in Arizona, from the Dragoon Mountains to the Baboquivari Mountains. Its foliage and the character of the localities in which it is found, indicate that it is a tree of relatively high water requirement. A closely related and very similar species, *B. occidentalis*, was detected at three places in Sonora, one of them near a natural water hole, and the second near a well. The third locality was in the center of a large valley where there are no wells, and it was interesting to note that an unsuccessful well had been dug to a considerable depth near the *Bumelia* trees, indicating that the high water requirement of the tree had not gone unobserved by the Mexican ranchers.

The valleys lying east of the Sierra Picu have a deep loam soil and a rich cover of vegetation. *Covillea* is infrequent here, and large trees of *Parkinsonia*, *Olneya* and *Prosopis* are intermingled with *Carnegiea*, *Pachycereus*, large colonies of *Lophocereus*, occasional colonies of *Lemaireocereus*, and frequent groups of a large Yucca, often reaching 25 ft. in height. Smaller cacti

and numerous species of shrubs, together with mats of the gray grass, *Hilaria*, all combine to make a highly diversified community of plants that constantly gives one the impression of being in some gigantic botanical garden.

In the Sierra Picu and the lower ranges of hills which lie between it and the valley of the Magdalena River, the traveler from the north finds more plants that are new to him than in the valleys. The general groundwork of the vegetation is composed of those species that extend north to the edge of the Sonoran Desert, but a large number of shrubs, cacti, vines and

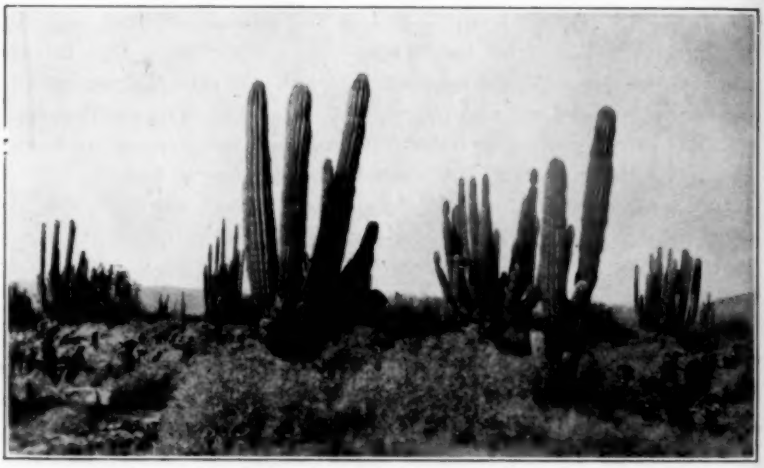

FIG. 2. *Pachycereus Pringlei*, 8 miles south of Libertad, Sonora.

herbaceous plants are already added to the vegetation here within a linear distance of 100 miles from the Boundary. One of the most striking and abundant of these is *Elaphrium microphyllum*, the copal tree, of the family *Burseraceae*. In the largest trees the trunk emerges from the rocks with a diameter of 12 to 14 inches. It branches freely and dwindles rapidly in thickness, so that the limbs 4 ft. from the ground are seldom more than 1 or 2 in. in thickness, while the twigs are of the ordinary size. The cortex is very thick, forming nearly half the thickness of the trunk, and exudes a milky and resinous sap when cut. The leaves are pinnate and dark green, the twigs a rich brownish red. The bark is stripped from the twigs by

Indians and used in weaving the colored designs of baskets. Another abundant shrub in which the branches dwindle rapidly in diameter is the terrote blanco, *Jatropha cinerea*, but the basal diameter is rarely more than 2 in. *Jatropha cordata* is abundant here, together with the similar but smaller leaved *J. cardiophylla*. An undescribed *Opuntia* of the series *Clavatae* is abundant in several localities, its erect branches giving the largest plants a resemblance to the cylindropuntias. The platyopuntias, or prickly pears, become very much less abundant in this region than they are at Tucson, both as to the number of species and individuals. This type of cactus appears to be unable to resist the adverse moisture conditions of the driest portions of the Sonoran Desert, as it is poorly represented here and also in Arizona west of the longitude of Phoenix.

The last one of the low passes in the Sierra Picu is 20 miles from the Gulf coast, and its elevation is approximately 1750 ft. The very gradual descent to sea-level is made over a detrital slope on which the vegetation is at first very heavy, then rather open, and finally very scanty and low. The vegetation of the heavily covered portion of the slope presents many features which distinguish it from similar situations to the east and north. The giant *Pachycereus Pringlei* here reaches such a size that many of the individuals must weigh 20 tons, as the largest plants of the much less massive *Carnegiea* are known to weigh half that much. *Lemaireocereus Schottii*, *Opuntia fulgida* and *O. gosseliniana* are also abundant. The principal distinctive features of the area, however, are the great number of small trees and the abundance and variety of shrubs and shrub-like perennials. The commonest of the trees are *Elaphrium microphyllum*, *Olneya tesota*, *Parkinsonia microphylla*, *Prosopis glandulosa* and *Parkinsonia Torreyana*. *Prosopis velutina*, characteristic of the higher portions of the Sonoran Desert, was not detected here. The shrubby vegetation not only includes the compact type, branching freely from the ground, but numerous individuals of *Malvaceous*, and *Solanaceous* shrubs, with a single erect stem and the form of a small tree. Some of these are not woody, and their presence is a strong indication that frosts are either absent or very light in this locality. Among the shrubs and suffrutescent perennials characteristic of the upper seaward slope are *Jatropha spathulata*, *Covillea tridentata*, *Encelia farinosa*,

Franseria dumosa, *Simmondsia californica*, *Abutilon palmeri*, *Sebastiania pavoniana*, *Acalypha adenostachya*, *Euphorbia tomentulosa*, *Franseria deltoidea*, *Solanum* sp., *Abutilon sonorae*, and *Horsfordia alata*.

After descending the slope to within 10 miles of the Gulf the vegetation becomes much poorer and more open. *Prosopis*, *Olneya*, *Covillea*, and *Fouquiera* are the most abundant of the larger plants. *Pachycereus* is much smaller and less abundant, and the only other cacti are the infrequent individuals of *Echinocactus Lecontei* and *Opuntia gosseliniana*.

The Bay of Libertad is a slight concavity in the coast line, stretching from Punto Lobos on the north to Punto Kino on the south, a distance of about 12 miles. There is a slight escarpment, of from 10 to 20 ft. along the entire coastline of the bay. The soil is a coarse loam except for a distance of about two miles just north of Punto Kino, where a belt of sand stretches for several miles inland. The surface of this area is stable and well covered with vegetation. Within half a mile of the escarpment the vegetation is very sparse, consisting of a few low individuals of *Covillea* and *Prosopis*, and occasional plants of *Ptiloria pauciflora*, *Frankinia Palmeri*, and *Psorobatus megacarpus*. Here also is to be found an interesting species of the night-blooming cactus, *Wilcoxia*, in which the storage organs are numerous enlarged portions of the root system resembling small sweet potatoes. Over 70 of these enlargements were taken from a single plant.

At Punto Kino a low range of granitic hills abuts directly on the coast. To the south the mountainous outline of Tiburon Island is plainly seen standing well out into the Gulf, and successive ranges of hills end in abrupt seaward slopes along the entire coast as far as Tiburon Island. Across the Gulf it is possible to make out the low outlines of Angel Guardia Island and to see the profile of the hills of Lower California, culminating in the San Pedro Martir Mountains. During the five days that we were within sight of the Gulf there was no evidence of human existence detected on its waters.

In sandy soil at the base of the outwash slopes which stretch north from the mountains at Punto Kino was found the heaviest stand of *Pachycereus* noted on the entire trip, accompanied by large and numerous examples of *Elaphrium microphyllum*.

Whereas the hills are the optimum habitat for arborescent cacti in the interior, at this locality they are bare of all but a few small individuals.

On approaching Punto Kino the eye is arrested by what appears to be a forest of small trees denuded of their branches and leaves, extending along the base of the hills. This proves to be the cirio, *Idria columnaris*, of the family *Fouquieraceae*, previously known only on the peninsula of Lower California. The trunk of this singular tree is from 12 to 18 in. in thickness at the base but tapers very rapidly to a slender top and rarely

FIG. 3. *Idria columnaris*, on rocky slopes near Punto Kino, Sonora. The trees in the center are *Elaphrium Macdougalii*.

exceeds 20 ft. in height. The trunk itself occasionally forks into two or three branches, all of which continue to grow in a vertical position. From base to top the trunk is beset with short slender lateral branches, growing in a horizontal position and bearing thorns and seasonal leaves after the manner of *Fouquiera*. The large racemose inflorescences are borne only at the upper end of the trunk or its branches. The trunk is smooth, of a pale salmon color, and the cortex is so soft that it can be cut with great ease. There is ligneous tissue throughout the cross section of the trunk, but the trunk also serves as a reservoir for a considerable quantity of water. The very young individuals of

Idria are globose, and all of the thickening of the stem is above ground.

The heaviest stands of *Idria* were along the base of the granitic hills. It is infrequent on the upper slopes, and nowhere grows very far away from rock in place. Unlike most plants at the northernmost limit of their occurrence, *Idria* is more abundant on north slopes than on south slopes. It was found inland from Punto Kino as far as the hills extend, and southward as far as the second ridge of hills below the point, which marked the southern limit of our exploration.

Throughout these hills *Idria* is the most conspicuous plant, *Pachycereus*, *Lophocereus* and *Lemaireocereus* are all infrequent, although they may be found in the valleys and on alluvial slopes. *Carnegiea* is confined to the hills, but nowhere reaches its customary size. *Parkinsonia* is very uncommon, and *Covillea* is confined to coarse detrital slopes at the bases of the hills. On the slopes there are few large individuals of any plants. The most characteristic forms are *Elaphrium Macdougalii*, *Olneya tesota*, *Idria columnaris*, *Jatropha cinerea*, *Simmondsia californica*, *Hyptis Emoryi*, *Opuntia Bigelovii*, *Fouquiera splendens*, *Encelia farinosa*, *Franseria dumosa*, *Trixis angustifolia*, *Verbesina chihuahuensis*, *Porophyllum gracile*, *Hibiscus denudatus*, *Stegnosperma halimifolium* and *Ptiloria pauciflora*.

The vicinity of Libertad and the hills of Punto Kino were of particular interest as examples of a pronounced desert running right down to the shores of a large body of water. While the temperature conditions here are extremely favorable there is every evidence that the precipitation is much less along the coast than it is 10 miles and more inland. In November, 1923, the writer installed non-evaporating volumetric rain gauges at Libertad and at the pass in the Sierra Picu 18 miles from Libertad. At the latter locality a Six's maximum-minimum thermometer was also installed. These instruments were read in March, 1924, by Mr. Gilbert Sykes. The precipitation at Libertad was 1.0 cm. and at Picu pass 4.8 cm., while for the same period at Tucson it was 11.2 cm. The minimum temperature at Picu Pass was 34° F., and for the same period at Tucson 27.5° F. These figures indicate the extreme aridity of the coastal belt and show that the precipitation of the hills nearest the coast is considerably higher. The minimum temperature reading

shows that there are at least occasional winters without frost, a thing that can not be said of the more elevated portions of the Sonoran Desert. At Libertad and Punto Kino freezing temperatures doubtless occur only at rare intervals and for periods of very brief duration.

DESERT LABORATORY
TUCSON, ARIZONA.

Miscellaneous notes on plants of Southern California—III*

PHILIP A. MUNZ† AND IVAN M. JOHNSTON‡

In the following pages specimens cited as (B) are at the C. F. Baker Herbarium of Pomona College, and those as (G) at the Gray Herbarium of Harvard University.

ERIOGONUM KENNEDYI Porter

A study of the type of *E. Kennedyi* Porter (Wats. Proc. Am. Acad. **12**: 263. 1877), contained in the Gray Herbarium, has shown that it differs in the shape of its calyx-lobes from those plants commonly identified as *E. Kennedyi* which grow in the San Bernardino Mts. and in the Mt. Piños region. The original material of the species, according to its label, is from "Kern County, California." It has broadly elliptical calyx-segments which are very abruptly expanded and rounded at the base, whereas the more southern material has obovate or narrowly obovate segments which are gradually contracted toward the base and cuneate. Although these two forms differ markedly in the shape of the calyx-lobes, they are indistinguishable otherwise, and it seems best to consider them only varietally distinct.

Eriogonum Kennedyi var. **austromontanum** var. nov.

Plant with the habit of the species, but differing in having obovate or oblance-obovate calyx-segments which are gradually contracted into a cuneate base.—VENTURA COUNTY: Fraziers Borax Mine, Mt. Piños, *Abrams & McGregor 264* (G); Upper Lockwood Valley, Mt. Piños, *Dudley & Lamb 4675* (B). SAN BERNARDINO COUNTY: Bear Valley, San Bernardino Mts., alt. 6500 ft., July 4, 1920, *R. D. Harwood 4369* (TYPE, Baker Herb. 9162); Bear Valley, San Bernardino Mts., *Parish 3736* and *3166* (G), *Abrams 2890* (G), *Abrams 2119* (B); summit of San Gorgonio, alt. 11500 ft., *Grant 453* (B, G), San Gorgonio Summit, 11000 to 11500 ft. alt., *Munz 6208* (B); San Gorgonio Mt., alt. 11700 ft., *Burlew 3587* (G).

---

* The second paper of this series was published in the Bulletin for December, 1922 (**49**: 349–359).

† Pomona College, Claremont, California.

‡ Gray Herbarium, Harvard University.

In the San Bernardino Mts. about the crest of Mt. San Gorgonio, at altitudes from 11000 to 11700 ft., the var. *austromontanum* becomes consistently much reduced in stature, having stems only 1–2 cm. high. This form, typified by *Munz 6208* (Baker Herb. 12844), may be known as the forma **alpigenum.**

Malvastrum clementinum sp. nov.

A rounded tufted shrub with many ascendingly branched stems 7–10 dm. high; stems rather coarse, tomentose when young; leaves angularly 3-lobed or orbicular or ovate, 3–5 cm. broad, base cordate, margin irregularly crenate, upper surface green but with a very sparse stellate pubescence, under surface canescent with a dense stellate tomentum, veiny; flowers many, subsessile and densely glomerate in the axils of the uppermost leaves and continuing out into an elongate naked interrupted spike 1–2 dm. long; calyx 7 mm. high, loosely stellate-tomentose; calyx-lobes broadly lanceolate, acute, enervose, 4 mm. long; bractlets filiform, well developed, nearly reaching the tips of the calyx-lobes; corolla pink, in color suggesting that of apple-blossoms, lobes oblong-obovate, about 13 mm. long; carpels 2.5–3 mm. high, 8–10, thin-walled, smooth, promptly deciduous, inner edge excised, summit stellate-tomentose, sides and base glabrous; seeds ovoid, 1.8 mm. long, short villous.

LOS ANGELES COUNTY: On walls of the canyon running into the sea from Lemon Tank, San Clemente Island, April 9, 1923, *Munz 6684* (TYPE, Baker Herb. 20491; ISOTYPE, Gray Herb.).

This beautiful Malvastrum was found to be occasional in rock-crevices and at the base of rocky walls of a very precipitous canyon on the northeast side of San Clemente Island. It is characterized by its pale dense stellate pubescence with long trichome-branches, by its conspicuously bicolored leaves, and by its very dense interrupted spicate inflorescence. It suggests typical *M. fasciculatum* (T. & G.) Greene in the contour of its bicolored leaves, but differs in its much looser pubescence of long whitish hairs, in its more crowded flowers, more deeply lobed and more loosely pubescent calyces, and very much longer bractlets. From *M. Fremonti* Torr. and allies, which it suggests in its loose tomentum and interrupted congested spikes, it differs in its longer pubescence, bicolored leaves, and longer bractlets.

Malvastrum nesioticum Robins., an endemic of Santa Cruz Island, differs from *M. clementinum* in the characters enumerated for *M. fasciculatum*, and furthermore, like **M. fasciculatum** var.

laxiflorum (Gray) n. comb.,* may be distinguished by its very branched lax inflorescence.

Styrax officinalis var. **fulvescens** (Eastw.) comb. nov.

Styrax californica var. *fulvescens* Eastw. Bot. Gaz. **41**: 286. 1906.

SANTA BARBARA COUNTY: Santa Barbara, 1873, *Bolander* (G); Santa Inez Mts., 1891, *Dunn* (B); Painted Cave Ranch, *Eastwood 33* (G). LOS ANGELES COUNTY: "Los Angeles," 1879, *Nevin* (G). SAN BERNARDINO COUNTY: Waterman Canyon, *Parish 11389* (B), *Munz 2228* (B), 1916, *Crawford* (B); City Creek, *Johnston 2857* and *2935* (B); Devil Canyon, 1904, *Wilder* (B); San Bernardino, 1896, *Cummings* (G); *Wright 210* (G); without locality, 1876, *Parry & Lemmon 226* (G). ORANGE COUNTY: Trabuco Canyon, 1903, *Bradshaw* (B), *Peirson 3493* (B). SAN DIEGO COUNTY: Mesa Grande, *Spencer 1147* (B, G).

Perkins (Pflanzenr. iv. Fam. 241, 10 and 80. 1907) has treated *S. californica* Torr. and *S. californica* var. *fulvescens* Eastw. as identical with *S. officinalis* L., a species of the Mediterranean region of the Old World. *Styrax officinalis* is, indeed, very closely related to the Californian plants, particularly so to typical *S. californica*. The latter has the same shape of leaf and similar flowers, differing from the Mediterranean species chiefly in pubescence, being glabrate or lightly tomentose on the under side leaf-surfaces instead of closely and densely white-tomentose. In certain material from Greece, however, the pubescence is similar to the densest produced by *S. californica*. In *S. californica* var. *fulvescens*, and in the pubescent forms of *S. californica* the pubescence is dimorphic on the veins and mid-rib, dark colored trichomes (appearing as glandular atoms to the unaided eye) being scattered among and projecting above the pallid mass of the tomentum. These trichomes are present in the European material, but are not dark-colored. The style in the Mediterranean plants appears to be less compressed than in the American material and is less evidently lobed. Since the only differences detectable between the European and

* *Malvastrum Thurberi* var. *laxiflorum* Gray, Proc. Am. Acad. **22**: 291. 1887. *M. splendidum* Kell., Proc. Calif. Acad. Sci. **1**: 65. 1855. *Malacothamnus fasciculatus splendidus* Abrams, Bull. N. Y. Bot. Gard. **6**: 417. 1910.

Californian material are minor ones and relative in nature, it has been thought best to treat the two Californian forms of *Styrax* as **S. officinalis** var. **californica** (Torr.) n. comb. and as *S. officinalis* var. *fulvescens* (Eastw.) Munz & Johnston.

Styrax officinalis var. *fulvescens* differs from the var. *californica* in its broader, heavily tomentose, usually subcordate leaves, and characteristically fulvescent pubescence. It ranges along the coastal slopes of California from the mountains back of Santa Barbara to those back of San Diego, whereas the var. *californica* occurs in northern California on the hills surrounding the Sacramento valley, from Colusa and Calaveras Counties northward to Shasta County. The range of the two varieties is hence widely separated.

Phacelia (§ Eutoca) **Keckii** sp. nov.

Erect or ascending annual 1–4 dm. high, branching freely, densely short spreading viscid villous, somewhat canescent but stems more or less reddish brown in color; leaves firm, concolored, ovate or oblong, principal ones 20–35 mm. long and 9–20 mm. wide, deeply crenate-dentate, apex obtusish, base broadly cuneate; petioles of lower leaves 15–20 mm. long, of upper leaves 3–7 mm. long; flowers in rather dense terminal unilateral circinate racemes becoming 3–5 cm. long; pedicels 1–2 mm. long; sepals green, narrowly oblanceolate, acute, short viscid hirsute, becoming 7–8 mm. long; corolla tubular-funnelform, sparsely pubescent outside, 12–14 mm. long, ca. 7 mm. wide, the expanded throat and ascending limb purplish-red; lobes suborbicular, ca. 2.5 mm. long; tube cylindrical, 2.0 to 2.5 mm. thick, about 8 mm. long, yellowish with linear purplish stripes; stamens glabrous, unequal, 5–6 mm. long; appendages linear, 2–3 mm. long, adnate to corolla, united to filaments for about 2 mm.; ovary and style glandular and pubescent; style scarcely exceeding calyx, apically bifid; ovules ca. 8; capsules 4–5 mm. long, ovoid, pubescent; seeds brownish, angled, acute ovate or oblong in dorsal outline, coarsely foveolate.

RIVERSIDE COUNTY: along trail from Glen Ivy to Santiago Peak, Santa Ana Mts., alt. 4000 ft., *Munz 7056* (TYPE, Baker Herb. 20490; ISOTYPE, Gray Herb.). ORANGE COUNTY: west slope of Santa Ana Mts., alt. 4800 ft., *Munz 7763* (B).

Growing on dry slopes and ridges in the chaparral belt, between 3500 and 5000 ft. alt., on both the east and west sides of the Santa Ana Mts. The species is apparently most closely related to *P. suaveolens* Greene, and keys out to that species in

Brand's monograph (Pflanzenr. iv. Fam. 251, 113, fig. 19. 1913). It differs in its much longer narrower corolla, smaller, narrow capsule, and detached southern range. The two species are similar in gross aspect. The new species is named for Mr. David Keck, an enthusiastic young student, who helped collect the type and who has been of much assistance to the senior author in field work.

Galium gabrielense sp. nov.

A dioecious perennial herb 5–20 cm. high, dull and cinerescent throughout from a short hirsute pubescence, with a coarse taproot crowned with a small compact caudex tending to produce short stolons; stems herbaceous, in crowded tufts, simple or branched only above, evidently quadrangular, each side bisulcate; leaves in whorls of 4, linear or rarely oblongish, 5–10 mm. long, 1–2 mm. broad, acute but not cuspidate, commonly not exceeding the internodes; inflorescence cylindrical, 3–8 cm. long, 2–3 cm. thick, consisting of small cymes terminating the stem and the rather numerous short ascending laterals; corolla yellowish, short hirsute externally, with 4 oblong-ovate broadly acute spreading lobes, limb 3 mm. broad; fruit covered with long (1–1.5 mm.) white straight hairs; carpels 1.5 mm. thick, dry.

LOS ANGELES COUNTY: Baldy U. S. F. S. Lookout, alt. 7000 ft., *Johnston 1262* (B); Cow Canyon Divide, June 7, 1919, *Peirson* (B). SAN BERNARDINO COUNTY: ridge east of Ontario Peak, alt. 8400 ft., *Munz 6078* (TYPE, Baker Herb. 13691); San Antonio Canyon, alt. 5750 ft., *Johnston 1591* (B).

This species is not uncommon in the pine-belt of the eastern section of the San Gabriel Mts. in the vicinity of Mt. San Antonio. It frequents well drained gravelly situations under the pines and forms scattered open colonies 1–2 m. broad. It was reported by Johnston (Plant World **22**: 118. 1919) as doubtfully referable to *Galium siccatum* Wight. Wight's type is in the herbarium of the California Academy of Sciences, and evidently represents a bushy fruticose plant 3–12 dm. high. It suggests *G. angustifolium* Nutt. in gross habit, and may be only a cinereous-puberulent phase of the Nuttallian species. *Galium gabrielense* is, hence, not a close relative of *G. siccatum*. Its relations are probably with *G. multiflorum* Kell. and its relatives, from which the new species is readily distinguished by its tufted strict habit, narrow leaves, and dull grayish hirsute pubescence.

Downingia concolor Greene

Jepson (Madroña **1**: 101. 1922) in his excellent recent revision of the Californian Downingias does not report this species from Southern California, but the following material, which differs from the subjoined species in having two nipples and two purple spots at the faucal edge of the lower corolla-lip, as well as having the lateral corolla-sinuses cut below the plane of the limb, is either *D. concolor* Greene (Bull. Calif. Acad. Sci. **2**: 153. 1886) or a closely related undescribed form.

SAN DIEGO COUNTY: Margin of Cuyamaca Lake, *Abrams 3851* (G); in shallow water, Cuyamaca Valley, *Parish Bros. 394* (G); in pools on the mesas, May 5, 1920, *Spencer 1073* (B).

Downingia immaculata sp. nov.

Erect glabrous annual herb, branched only at the base, 1–2 dm. high; leaves few oblong or oblong-lanceolate, 5–12 mm. long, 1.5–2.5 mm. wide; sepals linear, ascending or erect, equalling or exceeding the length of the corolla-tube; corolla predominantly blue; lower lip flat, 9–14 mm. broad, with 3 spreading broadly obovate somewhat angular mucronate lobes, with a white central field enlivened by 2 more or less confluent yellow spots and traversed by two weak plaits; upper lip cleft, the 2 lobes narrow, acute, paralleling or slightly spreading, curving backwards; lateral corolla-sinuses scarcely if at all cut below plane of limb; corolla-tube narrowly funnelform, in length about equalling the upper corolla-lobes, 3–4 mm. long; corolla-throat obscurely bidentate on lower edge, unspotted; stamineal tube partially exserted, practically straight, cylindrical, ca. 2.5 times as long as thick.

RIVERSIDE COUNTY: On desiccated clay mud-flat south of Lake Elsinore, alt. 1250 ft., April 29, 1922, *Munz 5093* (TYPE, Baker Herb. 13766); Perris, 1922, *Banning Flower Show* (B); rare on desiccating mud-flat, Menifee Valley, alt. 1350 ft., *Munz & Johnston 5380* (B). SAN DIEGO COUNTY: In clay depressions on the mesas, San Diego, *T. S. Brandegee* (*Baker distribution*) *1668* (B, G); wet places around shallow pools, 6 mi. north of San Diego, *Peirson 3394* (B); in pools on Camp Kearny road, San Diego, alt. 400 ft., April 16, 1919, *Spencer 1073* (G); exsiccated places on mesas, near San Diego, *Abrams 3445* (B, G).

This is the most common Downingia in Southern California and that which has mainly passed as *D. pulchella* (Lindl.) Torr.

That species differs, however, in having usually a larger corolla with different proportions and a lighter shade of blue and has 3 small blue spots along the faucal edge of the lower lip, in addition to having more developed, straight, strongly divergent upper corolla-lobes, a less developed corolla-tube, an evidently exserted stamineal tube, divergent sepals, and a distinct northern range.

The only material of true *D. pulchella* studied from Southern California is the specimen in the Gray Herbarium collected by J. G. Cooper in "wet ground" on the "Upper Mojave River ?." From this station and others in San Luis Obispo County, it ranges northward through the state. It is not improbable that *D. immaculata* is the same as *D. pulchella* var. *arcana* Jepson (Madroña **1**: 100. 1922), a variety based upon material collected at La Mesa, San Diego County. Since both *D. immaculata* and *D. concolor* occur in that vicinity and are equally well covered by Jepson's brief description, we are basing our *D. immaculata* upon material which we know to be characteristic of the concept we have in mind, rather than forming a binomial based upon Jepson's trinomial.

Stephanomeria Blairi sp. nov.

A coarse-stemmed, straggly, lactiferous shrub ca. 12 dm. high; flowering branch decidedly woody, 4–5 dm. long, becoming 8–10 mm. thick, lightly white-tomentose above, below lucid light-brown and studded with the persistent indurated bases of the petioles; leaves crowded, abruptly reduced up the stem, obovate to oblong-obovate, 5–13 cm. long, 4–6 cm. broad, firm but rather thin, light green, glabrate, secondary venation evident and abundant, base broadly cuneate, apex rounded, margin very coarsely and unequally sinuate or lobulate; petioles ca. 1 cm. long, frequently narrow winged, base thickened and persistent; inflorescence terminal, stiff, paniculate, 5–20 cm. long, 8–10 cm. thick, branches strict or ascending and several to many-headed; peduncles 2–4 mm. long, stiff, bracteolate; heads narrowly cylindrical, 9–12-flowered, ca. 7 mm. high; inner tegules about equal, linear rounded, pale green and somewhat tinged with rose, 6 mm. long; outer tegules short-lanceolate 1–2-seriate, 1–1.5 mm. long; ligules rose-colored, ca. 1 cm. long, somewhat puberulent outside, tip 2–3-dentate; anthers deeply sagittate, ca. 5 mm. long, auricles linear and obtusish or even subapically dilated; style-branches linear; achenes 3–3.5 mm. long, 5–6 times as long as thick, gray-brown, pentangular, faces

with 1–3 shallow longitudinal grooves, apex truncate, base callous-tipped; pappus of numerous white antrorsely bearded deciduous bristles ca. 4 mm. long; receptacle low convex, glabrous, bearing umbonate scars left by the excavated bases of the achene.

LOS ANGELES COUNTY: On a rocky canyon-wall, San Clemente Island, 1923, *E. G. Blair* (TYPE, Baker Herb. 20492); on rocky walls of the canyon running from Lemon Tank, San Clemente Island, *Munz 6681* (B).

A very remarkable species, apparently without immediate relatives, differing from all its congeners in its coarse woody habit and broad herbaceous veiny leaves. Although in gross aspect strange in Stephanomeria, the reproductive structures of the plant are quite characteristic of the genus. It is a pleasure to name this plant in honor of Mr. E. G. Blair of the San Clemente Sheep Co., who extended many courtesies to a Pomona College party during a visit to San Clemente Island in 1923, and who has obligingly furnished us with a fine flowering and fruiting specimen from the cliffs where the senior author had obtained a weathered inflorescence.

Studies in the genus Lupinus—XI. Some new names and combinations

CHARLES PIPER SMITH

The lupines of California, Oregon, and Washington have not as yet been treated, as a unit, by any one writer. Numerous botanists, holding widely differing taxonomic views, have contributed much to the literature of this genus in these three States, some one hundred ten species having been described from California alone, and about fifty others from Oregon and Washington. Recently I have attempted to coordinate all of these propositions, with the natural result that I find it necessary to present some new names and combinations. Accordingly I here offer some nomenclatural adjustments, in advance of a general treatment that will necessarily, because of its bulk, appear elsewhere.

1. **Lupinus lyallii fruticulosus** (Greene) comb. nov.
Lupinus fruticulosus Greene, Muhlenbergia **8:** 117. 1912.

The stoutest form of the species, with leanings toward *L. aridus:* flowers large and banner broad.

2. **Lupinus aridus Washoensis** (Heller) comb. nov.
Lupinus pinetorum Heller, Muhlenbergia **6:** 25. 1910; not *Lupinus pinetorum* Jones, Contr. West Bot. **8:** 25. 1898.
Lupinus Washoensis Heller, Muhlenbergia **6:** 72. 1910.

Pubescence long and widely spreading.

3. **Lupinus aridus Torreyi** (Gray) comb. nov.
Lupinus Torreyi Gray, King Expl. 58. 1871.
Lupinus sellulus Kellogg, Proc. Calif. Acad. **5:** 36. 1873.

Peduncles elongated, usually exceeding the foliage.

4. **Lupinus aridus abortivus** (Greene) comb. nov.
Lupinus abortivus Greene, Muhlenbergia **8:** 117. 1912.

Pubescence mostly short and appressed; racemes slender and loosely-flowered.

5. **Lupinus aridus Cusickii** (S. Wats.) comb. nov.
Lupinus Cusickii S. Wats., Proc. Am. Acad. **22:** 469. 1887.

Peduncles shorter and racemes all equalled or surpassed by the foliage, densely-flowered.

6. **Lupinus lepidus Culbertsoni** (Greene) comb. nov.

Lupinus Culbertsoni Greene, Leaflets **1:** 73. 1904.

Stems usually short, foliage greenish, not silky; lower flowers suberect after anthesis.

7. **Lupinus lepidus confertus** (Kellogg) comb. nov.

Lupinus confertus Kellogg, Proc. Calif. Acad. **2:** 192. 1862.

Stems usually elongated and leafy; foliage usually silky, not greenish; flowers many, crowded, spreading after anthesis.

8. **Lupinus laxiflorus calcaratus** (Kellogg) comb. nov.

Lupinus calcaratus Kellogg, Proc. Calif. Acad. **2:** 195. 1862.
Lupinus multitinctus A. Nels. Bot. Gaz. **53:** 221. 1912.
Lupinus variegatus Heller, Muhlenbergia **8:** 89. 1912.

Calyx-spur 1–3 mm. long. Too near *L. laxiflorus* to be a distinct species.

9. **Lupinus inyoensis demissus** var. nov.

Plantae 1–3 dm. altitudine, racemis 3–4 cm. longis, compactis, pedicellis 2 mm. longis, floribus 8–10 mm. longis, vexillo glabro.

Plants 1–3 dm. tall, racemes 3–4 cm. long, compact, pedicels 2 mm. long, flowers 8–10 mm. long, calyx merely gibbous, not woolly, banner suborbicular, glabrous.

OREGON. Baker County: Wallowa Mountains, 3 Sept., 1915, *M. E. Peck 5329* (WSO).

10. **Lupinus caudatus subtenellus** var. nov.

Foliolis linearis pubescentibus bene viridibus, racemis laxis, floribus 8–10 mm. longis, pedicellis gracilioribus 3–5 mm. longis.

Leaflets linear, short hairy, decidedly greenish, racemes lax, flowers 8–10 mm. long, pedicels more slender, 3–5 mm. long.

OREGON. Deschutes County: Paulina Lake, 30 July, 1894, *J. B. Leiberg 591* (UO).

11. **Lupinus holosericeus amblyophyllus** (Robinson) comb. nov.

Lupinus canescens amblyophyllus Robinson, Piper, Contr. U. S. Nat. Herb. **11:** 354. 1906.

Bracts early deciduous, as in *L. holosericeus* Nutt. and to which it is certainly closer than to *L. canescens*.

WASHINGTON. Douglas County: Egbert Springs, 5 July, 1893, *Sandberg & Leiberg 402* (CA, SCW).

12. **Lupinus bingenensis dubius** var. nov.

A *L. bingenensi* differt carina ciliata in marginibus superioribus.

Differing only in the keel being constantly ciliate on more or less of the upper edges, petals blue or white.

WASHINGTON. Benton County: Prosser, 27 May, 1903, *J. S. Cotton 1106* (TYPE, SCW 14130). Yakima County: Cleman Mountain, 13 May, 1923, *E. Nelson 1467* (CPS); Naches, 10 May, 1923, *E. Nelson 1453* (CPS); Yakima, 10 May, 1923, *E. Nelson 1452* (CPS). Kittitas County: Ellensburg, 2 May, 1897, *K. Whited* (UO).

BRITISH COLUMBIA. Kaslo District: Creston, 12 July, 1920, *W. B. Anderson 5949* (CPS).

13. **Lupinus oreganus Kincaidi** var. nov.

Labio superiore calycis brevi non operto lateribus reflexis vexilli, ungue vexilli longo.

Upper calyx-lip short, not concealed by the reflexed sides of the long-clawed banner.

OREGON. Benton County: Corvallis, 8 June, 1898, *T. Kincaid* (TYPE, SCW 14281).

14. **Lupinus oreganus pusillulus** var. nov.

Plantae solum 1–2 dm. altitudine, floribus 8–9 mm. longis, pedicellis prope 3 mm. longis pilis pandentibus, labio superiore fere inoperto.

Plants 1–2 dm. tall, flowers 8–9 mm. long, pedicels about 3 mm. long, spreading-pubescent, upper calyx-lip entirely exposed.

OREGON. Josephine County: Waldo, 13 miles southwest, 1 July, 1918, *M. E. Peck 8080* (TYPE, WSO; type duplicate, CPS).

15. **Lupinus leucophyllus Belliae** var. nov.

Floribus solum 8–10 mm. longis, caulibus plus minus villosis, racemis plerumque densis.

Flowers only 8–10 mm. long, stems more or less villous, racemes usually dense.

IDAHO. Power County: Crystal Creek, Sept., 1914, *Mrs. May Bell Zundel* (TYPE, DS; type duplicate, CPS).

Very common in eastern Oregon, Washington, and Idaho; about fifty sheets examined.

16. **Lupinus leucophyllus canescens** (Howell) comb. nov.

Lupinus canescens Howell, Erythea **1**: 110. 1893.

Flowers 8–10 mm. long, racemes dense or almost lax, stems without spreading hairs.

17. **Lupinus leucophyllus tenuispicus** (A. Nels.) comb. nov.

Lupinus tenuispicus A. Nels. Bot. Gaz. **54**: 410. 1912.

Flowers only 6–7 mm. long, banner suborbicular, racemes very slender, many-flowered, pubescence very short, somewhat spreading and tangled.

18. **Lupinus albifrons flumineus** var. nov.

Frutex humilis foliis parvis, foliolis petiolo 3–4-plo brevioribus, pilis pedicelli appresso-pubescentibus.

Low shrub with small leaves, the petioles 3–4 times as long as their leaflets, pedicels appressed-pubescent.

OREGON. Marion County: Willamette River, above Salem, 24 June, 1916, *J. C. Nelson 741* (TYPE, DS 71759).

Riverbanks and mountain sides, Oregon City to Siskiyou County, California; many sheets examined. I have collected it near Salem, Eugene, Wolf Creek, Grants Pass, Gold Hill, and Ashland. This is the *Lupinus holosericeus* of Howell, Piper, and others, not of Nuttall.

19. **Lupinus lapidicola** Heller, sp. nov.

Pumilio subalpina abbreviata appresso-sericea, foliis ad basin congregatis, utrimque sericeis, petiolis gracilibus 20–45 mm. longis, foliolis 7 ad 8, oblanceolatis apice acutis prope 10 mm. longis; pedunculis scaposis erectis aut ascendentibus 5–8 cm. longis, racemis subcapitatis, verticillis 2–3 bene separatis; floribus paucis 10–12 mm. longis, pedicellis 2–3 mm. longis appresso-sericeis; calyce sericeo labio superiore subdentato inferiore paulo tridentato; petalis caerulis aut purpuratis, vexillo glabro aut paulo pubescenti exterius, carina ciliata aut eciliata; legumina seminaque non vidi.

Appressed-silky, abbreviated, subalpine dwarf, scarcely 1 dm. tall; leaves crowded basally, silky both sides, petioles slender, 20–45 mm. long, leaflets 7 to 8, oblanceolate, acute at apex, about 10 mm. long; peduncles scape-like, erect or ascending, 5–8 cm. long, racemes subcapitate, of 2 or 3 well-separated whorls, about 4 cm. long; flowers few, 10–12 mm. long, pedicels 2–3 mm. long, appressed-silky, bracts subpersistent; calyx silky, upper lip notched, lower minutely tridentate; petals blue or purple, banner with a dull-yellow center, glabrous or

somewhat pubescent on the back, keel ciliate on the upper edges or non-ciliate, only the short acumen upturned; pods and seeds not seen.

CALIFORNIA. Siskiyou County: Gravelly slopes of Mount Eddy, 9 July, 1920, *A. A. Heller 13422* (TYPE, DS 113281; type duplicate, UCX).

20. **Lupinus sericeus flexuosus** (Lindl.) comb. nov.

Lupinus flexuosus Lindl., Agardh, Syn. Gen. Lup. 34. 1835.
Lupinus ornatus bracteatus Robinson, Piper, Contr. U. S. Nat. Herb. **11:** 355. 1906.
Lupinus subulatus Rydb., Bull. Torrey Club **34:** 43. 1907.

Pubescence of stems and petioles all appressed, but pedicels spreading-pubescent; floral bracts subpersistent, equalling or exceeding the buds.

21. **Lupinus ornatus obtusilobus** (Heller) comb. nov.

Lupinus obtusilobus Heller, Muhlenbergia **8:** 115. 1912.

Usually not over 3 dm. tall, subdecumbent to ascending; petioles 3–4 cm. long, pedicels more loosely appressed-pubescent, lower calyx-lip often tridentate.

22. **Lupinus latifolius columbianus** (Heller) comb. nov.

Lupinus confusus Heller, Muhlenbergia **8:** 63. 1912.
Lupinus columbianus Heller, ibid. **8:** 84. 1912.
Lupinus agninus Gandoger, Bull. Soc. Bot. France iv, **13:** 461. 1913.

Wing petals broader, outcurved on the lower free margins, covering all or most of the keel; leaflets glabrous above.

23. **Lupinus latifolius canadensis** var. nov.

A var. *columbiano* differt foliolis constanter pubescentibus super pilis brevibus appressisque.

Differing from var. *columbianus* only in having the leaflets consistently pubescent above with short appressed hairs; stems commonly branched, but sometimes simple and shortened.

BRITISH COLUMBIA. Vancouver Island: Colwood, 24 June, 1915, *C. F. Newcombe* (TYPE, DS; type duplicate, CPS); Duncan, 21 June, 1917, *W. B. Anderson* (CPS, PBC); Goldstream, 3 June, 1911, *C. F. Newcombe* (CPS); Oak Bay, 14 June, 1896, *J. R. Anderson* (CVP); Mount Benson, 27 June, 1898, *J. R. Anderson* (CPS, PBC); Palmer to Colwood, 25 July, 1922, *C. F. Newcombe*

& *C. P. Smith 3677* (CPS); Sahtlam, 11 May, 1915, *E. M. Anderson* (CPS, PBC); Shawingan, 24 May, 1897, *J. R. Anderson* (CPS, CVP, PBC); same, 19 July, 1917, *C. F. Newcombe* (CPS). Yale District: Mount Cheam, 14 Aug., 1896, *J. R. Anderson* (CPS, PBC). Lillooet District; Mount McLean, 28 July, 1916, *E. M. Anderson 2962* (CPS, PBC).

I am informed by both Mr. W. R. Carter and Dr. C. F. Newcombe that this is the most common and representative lupine of Vancouver Island. It has been called *L. nootkatensis*, *L. arcticus*, *L. laxiflorus*, and *L. columbianus*.

24. **Lupinus latifolius subalpinus** (Piper & Robinson) comb. nov.

Lupinus subalpinus Piper & Robinson, Contr. U. S. Nat. Herb. **11**: 356. 1906.

This also belongs to Heller's group *Latifolii* (Muhlenbergia **8**: 63. 1912), as shown by the ciliation of the keel, and is, to me, just another of the many variations of *L. latifolius, sensu lato.*

25. **Lupinus Abramsi** sp. nov.

Plantae ramosae decumbentes 5–6 dm. altitudine, albilanato-villosae; foliis albilanatis utrimque, petiolis brevis 3–5 cm. longis, foliolis 8 aut 9, oblanceolatis; pedunculis 6–10 cm. longis, racemis 15–25 cm. longis; floribus 14–16 mm. longis pandentibus verticillatis, bracteis deciduis villosis 10 mm. longis, pedicellis 4–7 mm. longis lanato-villosis; calyce bracteolato lanato labio superiore bifido inferiore tridentato; petalis latis caerulis vexillo pubescente apice exterius 15–16 mm. lato, carina ciliata marginibus superioribus; ovules 8 aut 9, legumina seminaque non vidi.

White-woolly-villous, decumbent, branched, 5–6 dm. tall; leaves many, white-woolly both sides, petioles short, 3–5 cm. long, leaflets 8 to 9, oblanceolate, acute or obtuse, 20–30 by 5–7 mm.; peduncles 6–10 cm. long, racemes 15–25 cm. long, flowers 14–16 mm. long, spreading, verticillate, bracts deciduous, villous, 10 mm. long, pedicels 4–7 mm. long, woolly-villous; calyx non-gibbose, woolly, upper lip bifid, lower 3-toothed; petals broad, blue, banner suborbicular, pubescent on the back near apex, 15–16 mm. wide, with a yellow center, keel slightly curved, ciliate along acumen and middle; ovules 8 to 9, pods and seeds not seen.

CALIFORNIA. Monterey County: Los Pesares, Santa Lucia Mountains, 9 June, 1920, *L. R. Abrams 7358* (TYPE, DS 103181); same, *L. R. Abrams 7360* (DS).

This belongs to Heller's group *Arborei* (Muhlenbergia **8:** 65. 1912); but cannot, as I see it, be referred to any of the described species, though having considerable resemblance to the very villous *L. formosus Bridgesii* Greene, of the *Albicaules*.

26. **Lupinus Cottoni** sp. nov.

Caules e stirpe ligneo eramosis corpulentis fistulosis glabratis; foliis paucis nullis ad basin, petiolis inferioribus 10–18 cm. longis, foliolis 5 ad 9, oblanceolatis, lucido-viridis, glabris super subpubescentibus subter; pedunculis 4–10 cm. longis, racemis 10–20 cm. longis; floribus 11–14 mm. longis subverticillatis, pedicellis 4–5 mm. longis gracilibus pilis pandentibus; calyce bracteolato labio superiore serrato aut integro inferiore integro, petalis latis, carina curvata paulo ciliata super marginibus; leguminibus 20 × 5 mm., appresso-pubescentibus, ovulis prope 6, seminibus 4 mm. longis pallidis minute maculatis.

Glabrate, 30–50 cm. tall, few-leaved, simple, stout, fistulous, from a woody caudex; leaves cauline, none strictly basal, lower petioles 10–18 cm. long, upper shorter, stipules lance-linear, 8–20 mm. long, leaflets five to nine, oblanceolate, acute, bright green, glabrous above, minutely and sparsely pubescent beneath, 40–70 mm. long by 8–20 mm. wide; peduncles 4–10 cm. long, racemes 10–20 cm. long; flowers 11–14 mm. long, subverticillate, spreading after anthesis, bracts about 5 mm. long, appressed-pubescent, early deciduous, pedicels 4–5 mm. long, slender, spreading-pubescent; calyx bracteolate, upper lip about 4 mm. long, entire or notched, lower some 5 mm. long, entire; petals wide, banner glabrous, almost as wide as long, keel arcuate, sparsely ciliate about the middle of the upper edges; pods 20 × 5 mm., appressed-hairy, ovules 6, seeds about 4 × 3 mm., pale flesh-color, closely dotted with purplish brown.

WASHINGTON. Yakima County: Head of Hell Roaring River, Mount Rainier National Forest, 7000 feet, 6 Sept., 1903, *J. S. Cotton 1518* (TYPE, SCW 13430); Mount Adams, 10 July, 1882, *L. F. Henderson* (UO); same, 13 Aug., 1882, ———— (UO); same, 16 Aug., 1882, *T. J. Howell* (DS, UO).

Subalpine meadows, near snowline. Labelled *L. Burkei*, but evidently nearer *L. Wyethii*, as commonly interpreted.

The following list explains the abbreviations herein used in citing the specimens examined:

CA, California Academy of Science, San Francisco;
CPS, herbarium of the writer;
CVP, herbarium of Prof. C. V. Piper;
DS, Dudley Herbarium, Stanford University;

PBC, Provincial Museum, Victoria, British Columbia;
SCW, State College of Washington, Pullman;
UCX, Division of Agronomy, University of California Experiment Station;
UO, University of Oregon, Eugene;
WSO, Willamette University, Salem, Oregon.

SAN JOSE, CALIFORNIA.

INDEX TO AMERICAN BOTANICAL LITERATURE

1920–1924

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

This Index is reprinted monthly on cards, and furnished in this form to subscribers at the rate of three cents for each card. Selections of cards are not permitted; each subscriber must take all cards published during the term of his subscription. Correspondence relating to the card issue should be addressed to Dr. Fred J. Seaver, N. Y. Botanical Garden, Bronx Park, N. Y. City.

Aamodt, O. S. The inheritance of growth habit and resistance to stem rust in a cross between two varieties of common wheat. Jour. Agr. Research **24:** 457–470. *pl. 1, 2.* 12 My 1923.

Abrams, L. R. An illustrated flora of the Pacific states, vol. I. Pp. i–xii + 1–558. Stanford University, California. 1923. [Illust.]

Abrams, L. R., & Coville, F. V. Juncaceae. In Abrams, L. R., An illustrated flora of the Pacific states **1:** 350–371. 1923. [Illust.]

Includes *Juncus macrandrus*, sp. nov.

Allen, R. F. Cytological studies of infection of Baart, Kanred, and Mindum wheats by *Puccinia graminis Tritici* forms III and XIX. Jour. Agr. Research **26:** 571–604. *pl. 1–7.* 22 D 1923.

Ames, O. Additions to the orchid flora of Central America. Sched. Orchid. **4:** 1–60. *pl. 2, 3.* 4 My 1923.

Includes *Lankasterella*, gen. and sp. nov., and new species in *Campylocentrum* (1), *Chondrorrhyncha* (1), *Cranichis* (2), *Cryptophoranthus* (1), *Dichaea*

(1), *Epidendrum* (9), *Habenaria* (1), *Malaxis* (1), *Oncidium* (1), *Ornithidium* (1), *Pleurothallis* (1), and *Stelis* (3).

Ames, O. Orchidaceae quaedam americanae. Sched. Orchid. **1:** 1–24. 18 N 1922.

Includes new species in *Elleanthus* (1), *Epidendrum* (9), *Gomphicis* (1), *Lepanthes* (1), *Physosiphon* (1), *Pleurothallis* (3), and *Stelis* (6).

Ames, O. Orchidaceae quaedam americanae II. Sched. Orchid. **2:** 1–38. *pl. 1.* 6 Ja 1923.

Includes new species in *Epidendrum* (5), *Lepanthes* (2), *Maxillaria* (1), *Ornithidium* (1), *Pelexia* (2), *Pleurothallis* (5), *Sarcoglottis* (4), *Spiranthes* (1), and *Stelis* (1).

Ames, O. New or noteworthy orchids. Sched. Orchid. **3:** 1–27. 30 Ja 1923.

Includes new American species in *Lepanthes* (3), *Ornithocephalus* (1), *Pleurothallis* (2), *Stelis* (3), *Telipogon* (1), and *Zygopetalum* (1).

Ames, O. New or noteworthy orchids from Central America and the Philippine Islands. Sched. Orchid. **5:** 1–42. *f. 1–6.* 6 Je 1923.

Includes new American species in *Campylocentrum* (1), *Epidendrum* (2), *Lepanthes* (2), *Lockhartia* (1), *Malaxis* (1), *Masdevallia* (1), *Notylia* (1), *Pleurothallis* (3), and *Trichogonidium* (1).

Anderson, E. N., & Walker, E. R. An ecological study of the Algae of some sandhill lakes. Trans. Am. Micr. Soc. **39:** 51–85. *pl. 3–12.* 1920.

Bailey, L. H. Various cultigens, and transfers in nomenclature. Gent. Herb. **1:** 113–136. *f. 51–61.* 1923.

Bakke, A. L., & Pammel, L. H. The effect of weeds upon crop production. Proc. Iowa Acad. Sci. **29:** 271–280. 1922.

Ball, C. R. *Salix.* In Abrams, L. R., An illustrated flora of the Pacific states **1:** 487–507. 1923. [Illust.]

Bergey, D. H., and others. Bergey's Manual of determinative bacteriology. Pp. i–xii + 1–442. Baltimore, Maryland. 1923.

Berry, E. W. Miocene plants from southern Mexico. Proc. U. S. Nat. Mus. **62**[19]**:** 1–27. *pl. 1–7.* 2 Je 1923.

Includes new species in *Polypodiales* (2), *Urticales* (1), *Ranales* (1), *Rosales* (2), *Geraniales* (4), *Sapindales* (6), *Rhamnales* (1), *Thymeleales* (3), *Myrtales* (4), *Gentianales* (2), and *Personales* (2).

Berry, E. W. Pathological conditions among fossil plants. In Moodie, R. L., Paleopathology 99–108. *pl. 12, 13.* Urbana, Illinois. 1923.

Berry, E. W. Tertiary fossil plants from the republic of Haiti. Proc. U. S. Nat. Mus. **62**[14]: 1–10. *pl. 1* + *f. 1, 2.* 28 D 1922.
Includes new species in *Characeae* (1), *Polypodiaceae* (1), *Simarubaceae* (1), *Lauraceae* (1), and *Sapotaceae* (3).

Berry, E. W. Tree ancestors—a glimpse into the past. Pp. i–vi + 1–270. *f. 1–48.* 1923.

Berry, J. A comparative study of the red-seeded and common dandelion [*Taraxacum*]. Proc. Iowa Acad. Sci. **29**: 313–318. 1922.

Bessey, E. A. *Nymphaea microphylla* in Michigan. Pap. Michigan Acad. Sci., Arts & Lett. **1**: 59, 60. F 1923.

Bigelow, N. K. The plankton of Lake Nipigon [Ontario] and environs. Univ. Toronto Stud. Biol. Ser. 22: 39–66. 1923.

Biourge, P. Les moisissures du groupe *Penicillium* Link. Cellule **33**: 1–332. *pl. 1–23.* 1923.

Bisby, G. R., & Buller, A. H. R. Preliminary list of Manitoba Fungi. Trans. Brit. Mycol. Soc. **8**: 91–109. 14 D 1922.

Black, O. F., Kelly, J. W., & Turner, H. C. Poisonous properties of *Bikukulla cucullaria* (Dutchman's-breeches) and *B. canadensis* (Squirrel-corn). Jour. Agr. Research **23**: 69–78. *pl. 1.* 13 Ja 1923.

Blake, S. F. Three new composites from Bolivia. Proc. Biol. Soc. Washington **36**: 51–54. 28 Mr 1923.
New species in *Erigeron* (1), *Aspilia* (1), and *Calea* (1).

Blake, S. F. Meliaceae. [In Standley, P. C., Trees and shrubs of Mexico.] Contrib. U. S. Nat. Herb. **23**: 553–563. 1923.

Blake, S. F. Polygalaceae. [In Standley, P. C., Trees and shrubs of Mexico.] Contrib. U. S. Nat. Herb. **23**: 578–595. 1923.

Bouly de Lesdain, M. Lichens du Mexique (Etats de Puebla et Michoacan) recuillis par le frère G. Arsène Brouard. Ier Supplement. Pp. 1–24. [1923].

Bower, F. O. The ferns (Filicales) treated comparatively with a view to their natural classification, vol. I. Pp. i–x + 1–360. *f. 1–307*. Cambridge, England. 1923.

Bowman, H. H. M. The development and activation of hibernacula. Pap. Michigan Acad. Sci., Arts & Lett. **1**: 61–73. *pl. 26–29*. F 1923.

Britton, N. L. Cyperaceae [excluding *Carex*]. In Abrams, L. R., An illustrated flora of the Pacific states **1**: 255–280. 1923.
Includes *Cyperus Hanseni* sp. nov., from California.

Britton, N. L., & Standley, P. C. Three new plants of the family *Rubiaceae* from Trinidad. Jour. Washington Acad. Sci. **13**: 105–107. 19 Mr 1923.
New species in *Evea* (1) and *Urceolaria* (2).

Brown, N. A. Experiments with Paris daisy and rose to produce resistance to crown gall. Phytopathology **13**: 85–99. *pl. 3, 4 + f. 1–4*. 27 F 1923.

Burnham, S. H., & Latham, R. A. The flora of the town of Southold, Long Island, and Gardiner's Island, New York. Torreya **23**: 3–9, 25–31. 1923.

Burt, E. A. Higher Fungi of the Hawaiian Islands. Ann. Missouri Bot. Gard. **10**: 179–190. Ap 1923.

Calvino, M. Quinientas toneladas anuales de forraje fresco. Cuba Secr. Agric. Com. y Trab. Bol. 50: 1–40. N 1922. [Illust.]

Camp, A. F. Citric acid as a source of carbon for certain *Citrus* fruit-destroying Fungi. Ann. Missouri Bot. Gard. **10**: 213–298. *pl. 14 + f. 1–21*. S 1923.

Cardot, J., & Brotherus, V. F. Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907–1909. X. Les Mousses. Kungl. Svenska Vetensk. Handl. **63**[10]: 1–74. *pl. 1–4*. 7 F 1923.
Includes 73 new species of mosses.

Carey, C. L. The relation of acidity to carbon dioxide adsorption by certain gels and plant tissues. Physiol. Researches **2**: 407, 408. My 1923.

Cavanagh, L. M. Notes on the genus *Catharinea* in Iowa. Proc. Iowa Acad. Sci. **28:** 223, 224. Ap 1921.

Chermezon, H. Sur la position systématique du genre *Remirea*. Bull. Soc. Bot. France **69:** 809–814. 1923.

Chiovenda, E. La culla del cocco. (Contributo alla ricerca della patria originaria della Palma del Cocco.)—V. Webbia **5:** 359–450. 1923.

Colin, H., & Franquet, R. Greffes *d'Helianthus* à inuline sur soleil annuel et sur diverses Composées. Bull. Mus. Nat. Hist. Natur. **1923:** 119–121. 1923.

Conard, H. S. A manual of the ferns and "fern-allies" of Grinnell [Iowa] and vicinity. Proc. Iowa Acad. Sci. **29:** 317–327. 1922.

Conard, H. S. A manual of the Gymnosperms ("evergreens") of Iowa, both native and cultivated. Proc. Iowa Acad. Sci. **29:** 328–338. 1922.

Coulter, M. C. Outline of genetics, with special reference to plant materials. Pp. i–viii + 1–212. *f. 1–34.* Ap 1923.

Cratty, R. I. Dr. Rudolph Gmelin and his collection of Minnesota, Wisconsin and Iowa plants. Proc. Iowa Acad. Sci. **28:** 247–255. 1921.

Cratty, R. I. Two additions to our list of Cruciferae. Proc. Iowa Acad. Sci. **28:** 256–262. *f. 32–35.* 1921.

Cremer, H. Untersuchungen über die periodischen Bewegungen der Laubblätter. Zeits. Bot. **15:** 593–656. *f. 1–66.* 1923.

Czurda, V. Zur Kenntnis der Brutzweibeln von *Lycopodium Selago* und *L. lucidulum*. Flora **116:** 457–475. *f. 1–7.* 1923.

Darlington, H. T. Contributions to the flora of Gogebic County, Michigan. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 74–82. F 1923.

Davidson, A. New plants from S. California. Bull. S. California Acad. Sci. **22:** 5, 6, 70–74. *pl. 16–20.* 1923.

New species in *Aster* (1), *Dudleya* (1), *Gilia* (2), *Hasseanthus* (1), and *Allium* (1).

Davidson, J., & Le Clerc, J. A. Effect of various inorganic nitrogen compounds, applied at different stages of growth, on the yield, composition, and quality of wheat. Jour. Agr. Research **23:** 55–68. 13 Ja 1923.

Deletang, L. F. Diatomeas subfosiles de Quilino (Córdoba [Argentina]) e importancia de las investigaciones micropaleontológicas. Physis **6:** 22–29. 30 N 1922.

Demerec, M. Inheritance of white seedlings in maize. Genetics **8:** 561–593. N 1923.

Dietel, P. Ein neues *Coleosporium* aus Mexico. Ann. Mycol. **21:** 340, 341. 1923.

Coleosporium Reichei sp. nov.

Dodge, B. O. The distribution of the orange rusts of *Rubus*. Phytopathology **13:** 61–74. 27 F 1923.

Duggar, B. M., & Armstrong, J. K. Indications respecting the nature of the infective particles in the mosaic disease of tobacco. Ann. Missouri Bot. Gard. **10:** 191–212. S 1923.

Durrell, L. W. The nodal infection of corn by *Diplodia Zeae*. Proc. Iowa Acad. Sci. **29:** 346, 347. 1922.

Edson, H. A., & Shapovalov, M. Parasitism of *Sclerotium Rolfsii* on Irish potatoes. Jour. Agr. Research **23:** 41–46. *pl. 1–3*. 6 Ja 1923.

Ellsworth, W. Parry's catalog of Iowa plants of 1848. Proc. Iowa Acad. Sci. **29:** 339–344. 1922.

Elmer, O. H. Studies of insect transmission and cross-inoculation of mosaic on the Solanaceae, Cucurbitaceae and Leguminosae. Proc. Iowa Acad. Sci. **29:** 311, 312. 1922.

Elmore, C. J. The diatoms (Bacillarioideae) of Nebraska. Nebraska Univ. Stud. **21:** 22–170. *pl. 1–22*. O 1921.

Emerson, R. A. The inheritance of blotch leaf in maize. Cornell Univ. Agr. Exp. Sta. Mem. 70: 1–16. *pl. 1–3*. Je 1923.

Farwell, O. A. Notes on the Michigan flora. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 85–100. F 1923.

Includes *Gentiana Billingtonii* sp. nov.

Fawcett, H. S., Horne, W. T., & Camp, A. F. *Citrus* blast and black pit. Univ. California Agr. Exp. Sta. Techn. Pap. 5: 1–24. *pl. 1–6.* My 1923.

Fernald, M. L., & Wiegand, K. M. Notes on some plants of the Ontario and St. Lawrence basins, New York. Rhodora **25:** 205–214. D 1923.

Garner, W. W., McMurtrey, J. E., Bacon, C. W., & Moss, E. G. Sand drown, a chlorosis of tobacco due to magnesium deficiency, and the relation of sulphates and chloride of potassium to the disease. Jour. Agr. Research **23:** 27–40. *pl. 1–7.* 6 Ja 1923.

Geitler, L. Der Zellbau von *Glaucocystis Nostochinearum* und *Gloeochaete Wittrockiana* und die Chromatophoren-Symbiosetheorie von Mereschkowsky. Arch. Protistenk. **47:** 1–24. *f. 1–8.* 8 N 1923.

Godfrey, G. H. A *Phytophthora* footrot of rhubarb. Jour. Agr. Research **23:** 1–26. *pl. 1–12* + *f. 1–3.* 6 Ja 1923.

Goodspeed, T. H. A preliminary note on the cytology of *Nicotiana* species and hybrids. Svenska Bot. Tidskr. **17:** 472–478. *f. 1, 2.* 1923.

Greenman, J. M. Studies of South American Senecios—I. Ann. Missouri Bot. Gard. **10:** 73–98. F 1923.

Includes 13 new species.

Håkansson, A. Studien über die Entwicklungsgeschichte der Umbelliferen. Lunds Univ. Årsskr. II **2:** 18[7]: 1–120. *pl. 1* + *f. 1–18.* 1923.

Haley, D. E. Availability of potassium in orthoclase for plant nutrition. Soil Sci. **15:** 167–180. Mr 1923.

Hall, H. M., & Clements, F. E. The phylogenetic method in taxonomy.—The North American species of *Artemisia, Chrysothamnus,* and *Atriplex.* Carnegie Inst. Washington Publ. **326:** 1–356. *pl. 1–58* + *f. 1–47.* 20 Jl 1923.

Harrington, G. T. Forcing the germination of freshly harvested wheat and other cereals. Jour. Agr. Research **23:** 79–100. 13 Ja 1923.

Harrington, G. T. Respiration of apple seeds. Jour. Agr. Research **23**: 117–130. 13 Ja 1923.

Hartmann, A. Zur Entwicklungsgeschichte und Biologie der Acanthaceen. Flora **116**: 216–258. *pl. 1–4*. 1923.

Hassler, E. Una nueva especie de lirio del Paraguay y de Misiones. Physis **6**: 359–361. 30 Ap 1923.

Marica candida, sp. nov.

Hassler, E. Una nueva especie de seibo. Physis **6**: 123–125. 30 N 1922.

Erythrina Dominguezii, sp. nov., from Argentina, Paraguay, and Gran Chaco.

Hauman, L. La vegetación de la isla Martín Garcia [Argentina]. Physis **7**: 55. 21 S 1923.

Hauman, L. Para la protección de la naturaleza en la Republica Argentina. Physis **6**: 283–300. *pl. 1–8*. 30 Ap 1923.

Contains information of special natural areas of Argentina.

Hauman, L. "Nomina conservanda" et "Nomina rejicienda." Physis **6**: 88–98. 30 N 1922.

Lists for plants of Argentina.

Hauman, L. El género "Proserpinaca L." en la America del Sur. Physis **6**: 151. 30 N 1922.

Heppner, M. J. A study of deciduous fruit tree rootstocks with special reference to their identification. Univ. California Agr. Exp. Sta. Techn. Pap. **6**: 1–26. *pl. 1–6*. Je 1923.

[Herrera, A. L.] Catalogo alfabetico de nombres vulgares y científicos de plantas que existen en Mexico. Pp. 1–32. Mexico. 1923.

Herzfelder, H. Experimente an Sporophyten von *Funaria hygrometrica*. Flora **116**: 476–490. *pl. 7 + f. 1–5*. 1923.

Herzog, T. Die Pflanzenwelt der bolivischen Anden und ihres östliches Vorlandes. Vegetation der Erde **15**: 1–258. *f. 1–25*. 1923.

Hill, A. F. The vegetation of the Penobscot Bay region, Maine. Proc. Portland Soc. Nat. Hist. **3**: 307–438. *f. 1–50*. 1923.

Hitchcock, A. S. Poaceae. In Abrams, L. R., An illustrated flora of the Pacific States **1**: 103–255. 1923. [Illust.]

Includes *Festuca Tracyi* sp. nov., from California.

Hoehne, F. C. Phytophysionomia do Estado de Matto-Grosso [Brazil] e ligeiras notas a respeito da composição e distribucão de sua flora. Pp. 1–104. Sao Paulo, Brazil. 1923. [Illust.]

Hoehne, F. C. Contribuicão ao conhecimento das Leguminosas da Rondonia [Brazil]. Comm. Linh. Telegr. Estrat. de Matto-Grosso ao Amazonas Annex. 5 Bot. **12**: 1–28. *pl. 178–192.* 1922.

Includes new species in *Inga* (1), *Calliandra* (1), *Mimosa* (4), *Macrolobium* (1), *Cassia* (4), *Swartzia* (2), *Arachis* (1), and *Centrosema* (1).

Hoehne, F. C., & Pilger, R. Novidades da flora Mattogrossenes [Brazil] e do hervario da Commissão Rondon. Revista Mus. Paulista **13**: 1245–1252. *pl. 1, 2.* 1923.

Includes new species in *Arthropogon* (1), *Capparis* (1), *Hirtella* (2), and *Aniseia* (1).

Howe, M. A. Two new Lithothamnieae, calcareous Algae, from the lower Miocene of Trinidad, British West Indies. Proc. U. S. Nat. Mus. **62**[7]: 1–3. *pl. 1–4.* 22 D 1922.

Hubert, E. E. The red stain in the wood of boxelder [*Acer Negundo* L.]. Jour. Agr. Research **26**: 447–458. *pl. 1–3* + *f. 1, 2.* 8 D 1923.

Caused by *Fusarium Negundi* Sherbakoff, sp. nov.

Hughes, D. K. *Orthacne* and *Streptachne.* Kew Bull. Misc. Inform. **1923**: 301–303. 1923. [Illust.]

Hutchinson, J. Affinity of *Rhododendron micranthum.* Kew Bull. Misc. Inform. **1923**: 299–301. 1923.

Suggested kinship with *Ledum glandulosum* Nutt. of western North America.

Hutchinson, J. Contributions towards a phylogenetic classification of flowering plants. Kew Bull. Misc. Inform. **1923**: 65–89, 241–261. 1923. [Illust.]

Ingham, W. Georgian mosses. Rev. Bryol. **48**: 43. 1921.

A short list of mosses from British Columbia.

Irmscher, E. Pflanzenverbreitung und Entwicklung der Kontinente. Mitteil. Inst. Allg. Bot. Hamburg **5:** 17–235. 1922.

Iwanoff, L. A., & Thielmann, M. Über den Einfluss des Lichtes verschiedener Wellenlänge auf die Transpiration der Pflanzen. Flora **116:** 296–311. 1923.

Jennison, H. M. Potato blackleg—with special reference to the etiological agent. Ann. Missouri Bot. Gard. **10:** 1–68. *pl. 1, 2.* F 123.

Jones, F. R. Stem and rootrot of peas in the United States caused by species of *Fusarium.* Jour. Agr. Research **26:** 459–476. *pl. 1 + f. 1.* 8 D 1923.

Kauffman, C. H. The mycological flora of the higher Rockies of Colorado. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 101–150. *pl. 30–34.* F 1923.

Includes new species in *Helotium* (1), *Boletus* (1), *Cortinarius* (7), *Marasmius* (2), *Pholiota* (1), and *Tricholoma* (1).

Keller, R. Über neue Arten der Gattung *Hypericum.* Bot. Jahrb. Syst., Pflanzengesch. u. Pflanzengeog. **58:** 193–199. 1923.

Includes 8 new American species.

King, C. J. Habits of the cotton rootrot fungus. Jour. Agr. Research **26:** 405–418. *pl. 1–7 + f. 1–4.* 1 D 1923.

Knowlton, C. H. *Butomus umbellatus* on the St. Lawrence River. Rhodora **25:** 220, 221. D 1923.

Kofoid, C. A., Severin, H. H. P., & Swezy, O. Nelson's spiral bodies in tomato mosaic. Phytopathology **13:** 330, 331. 28 Jl 1923.

Kränzlin, F. Orchidaceae—Monandrae—Pseudomonopodiales. Pflanzenreich IV 50: 1–66. *f. 1–5.* 1923.

Includes new American species in *Lockhartia* (3), *Pachyphyllum* (4), and *Dichaea* (13).

Kuhlmann, J. G. Gramineas (1 fasc.). Comm. Linh. Telegr. Estrat. de Matto-Grosso ao Amazonas [Brazil] Annex. 5 Bot. **11:** 1–96. *pl. 1–6.* 3 Mr 1922.

Includes *Spheneria,* gen. nov., and *Ichnanthus Rondonii,* sp. nov.

Kuhlmann, J. G. Contribuicão para o conhecimento de una nova especie de Lentibulariaceae. Comm. Linh. Telegr. Estrat. de Matto-Grosso ao Amazonas [Brazil] Annex. 5 Bot. **13:** 1, 2. Ap 1923. [Illust.]
Utricularia Hoehnei, sp. nov., from Brazil.

Kylin, H. Studien über die Entwicklungsgeschichte der Florideen. Kungl. Svenska Vetensk. Handl. **63**[11]: 1–139. *f. 1–82.* 10 Mr 1923.

La Rue, C. D. Notes on a bud-sport of *Hibiscus mutabilis* L. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 151–154. F 1923.

Laurent, V. Zur Entwicklungsgeschichte von *Corytoloma cyclophyllum* Dus. n. sp. ined. Svensk. Bot. Tidskr. **17:** 165–174. *f. 1–3.* 1923.
Corytoloma cyclophyllum, sp. nov., from Brazil.

Lavialle, P., & Delacroix, J. Caractères histologiques du péricarpe et déhiscence du fruit chez les Euphorbes. Bull. Soc. Bot. France **69:** 585–590. *f. 1, 2.* 1923.

Lehman, S. G. Pod and stem blight of soybean. Ann. Missouri Bot. Gard. **10:** 111–178. *pl. 9–13* + *f. 1–13.* Ap 1923.

Leonard, L. T. Nodule-production kinship between the soybean and the cowpea. Soil Sci. **15:** 277–284. Ap 1923.

Linsbauer, K. Über die Interferenz von Stossreizen und über Ermüdungserscheinungen an Blattgelenken von *Mimosa pudica*. Jahrb. Wissensch. Bot. **62:** 283–327. *f. 1–9.* 1923.

Lizer, C. Una nueva criptógama para la Argentina. Physis **6:** 325. 30 Ap 1923.
Pseudoaplosporella aurantiorum Speg.

Loeske, L. Bryologische Notizen. Herbarium **2:** 145–149. 1923.

Lutz, F. E. Altitude in Colorado and geographical distribution. Bull. Amer. Mus. Nat. Hist. **46:** 335–366. *f. 1–9.* 31 My 1922.
Data considered are chiefly botanical.

Mackenzie, K. K. *Carex.* In Abrams, L. R., An illustrated flora of the Pacific states **1:** 282–344. 1923. [Illust.]
Includes 2 new species.

Malme, G. O. A:N. *Desmodii* species in Herbario Regnelliano asservatae. Arkiv Bot. **18**[7]: 1–20. *pl. 1–4.* 22 N 1922.
Includes 4 new species of *Desmodium* from Brazil.

Malme, G. O. A:N. Die Flechten der ersten Regnellschen Expedition. Die Gattungen *Bombyliospora, Megalospora, Catillaria* und *Rhizocarpon*. Arkiv Bot. **18**[12]: 1–18. 2 F 1923.
Includes new species from Brazil in *Megalospora* (1) and *Catillaria* (6).

Marchionatto, J. B. Contribucion al estudio de los hongos parasitos de nispero del Japon. Rev. Facult. Agron. Univ. Nac. La Plata **15:** 69–72. 1923. [Illust.]

Marchionatto, J. B. Sobre la presencìa de la *Sclerotinia Trifoliorum* Erikss. en la Republica Argentina. Rev. Facult. Agron. Univ. Nac. La Plata **15:** 65–67. 1923. [Illust.]

Marchionatto, J. B. Notas sobre la *S[ophora] japonica* L. y la *S. tomentosa* L. Rev. Facult. Agron. Univ. Nac. La Plata **15:** 73–76. 1923. [Illust.]

Marquand, C. V. B. Additions to the flora of the Falkland Islands. Kew Bull. Misc. Inform. **1923:** 369–371. 1923.

Martin, J. N. The structure and development of the seed coat and cause of delayed germination in *Melilotus albus*. Proc. Iowa Acad. Sci. **29:** 345, 346. 1922.

Martin, J. N., Werkenthin, F. C., & Hudson, E. Structure and function of the stigma in relation to the germination requirements of the pollen in the Easter Lily. Proc. Iowa Acad. Sci. **29:** 345. 1922.

Martin, T. L. Soil flora studies. Soil Sci. **16:** 475–478. D 1923.

Mason, T. G. A note on growth and the transport of organic substances in bitter cassava (*Manihot utilissima*). Sci. Proc. Roy. Dublin Soc. **17:** 105–112. Je 1923.

Maximow, N. A. Physiologisch-ökologische Untersuchungen über die Dürreresistenz der Xerophyten. Jahrb. Wissens. Bot. **62:** 128–144. 1923.

Maxon, W. R. A new *Dryopteris* from Dominica. Proc. Biol. Soc. Washington **36:** 49, 50. 28 Mr. 1923.
Dryopteris mollicella sp. nov.

Maxon, W. R. The genus *Microstaphyla*. Jour. Washington Acad. Sci. **13:** 28–31. 19 Ja 1923.
Includes *Microstaphyla columbiana* sp. nov.

Maxon, W. R. Pteridophyta [excluding Isoetaceae]. In Abrams, L. R., An illustrated flora of the Pacific states **1:** 1–35, 38–50. 1923. [Illust.]

Mazza, A. Aggiunte al saggio di Algologia Oceanica. Nuov. Notar. **35:** 1–27. 1923. ["1924."]

McAtee, W. L. Notes on interesting plants of Michigan. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 155–166. F 1923.
Being notes made by the late C. F. Wheeler.

McCrea, A. Longevity in spores of *Aspergillus Oryzae* and *Rhizopus nigricans*. Science II **58:** 426. 23 N 1923.

McKee, R. History and seed production of purple vetch. U. S. Dept. Agr. Circ. **256:** 1–5. *f. 1.* F 1923.

McKinney, H. H., Eckerson, S. H., & Webb, R. W. The intracellular bodies associated with the rosette disease and a mosaiclike leaf mottling of wheat. Jour. Agr. Research **26:** 605–608. *pl. 1–8.* 22 D 1923.

Miller, R. B. First report on a forestry survey of Illinois. Bull. Illinois Nat. Hist. Surv. **14:** 291–378. *pl. 72–100.* Mr 1923. [With map.]

Molfino, J. F. Una Burmaniácea interesante para Misiones: "Apteria lilacina" Miers. Physis **6:** 328–330. 30 Ap 1923. [With plate.]

Molfino, J. F. Cuatro Eriocauláceas para la Argentina. Physis **6:** 361–363. 30 Ap 1923.

Molfino, J. F. Enumeración de las Lentibulariáceas argentinas. Physis **6:** 353–355. 30 Ap 1923.

Molfino, J. F. Monocotiledóneas para la Argentina. Physis **6:** 152–154. 30 N 1922.

Molfino, J. F. Nictagináceas de interes para la flora Argentina. Physis **7:** 50–53. 21 S 1923.

Molfino, J. F. Notas botanicas—I. Physis **6:** 128–150. 30 N 1922.

Molfino, J. F. "Physostemon," un nuevo genero de Caparidáceas para el pais [Argentina]. Physis **7:** 53. 21 S 1923.

Mounce, I. Homothallism and heterothallism in the genus *Coprinus*. Trans. Brit. Mycol. Soc. **7:** 256–269. 21 Jl 1922.

Mounce, I. Homothallism and the production of fruit-bodies by monosporous mycelia in the genus *Coprinus*. Trans. Brit. Mycol. Soc. **7:** 198–217. *pl. 6, 7.* 13 D 1921.

Muncie, J. H. The relation of cucurbit mosaic to wild catnip. Proc. Iowa Acad. Sci. 29: 346. 1922.

Munz, P. A. Southern California plant notes—I. Bull. S. California Acad. Sci. **22:** 7–11. Mr 1923.

Murphy, P. A. On the cause of rolling in potato foliage; and on some further insect carriers of the leaf-roll disease. Roy. Dublin Soc. Sci. Proc. **17:** 163–184. *pl. 6.* Je 1923.

Neger, F. W. Beiträge zur Biologie der Erysìpheen.—III. Flora **116:** 331–335. *f. 1.* 1923.

Newhall, A. G. Seed transmission of lettuce mosaic. Phytopathology **13:** 104–106. 27 F 1923.

Newton, J. D. A comparison of the absorption of inorganic elements, and of the buffer systems of legumes and non-legumes, and its bearing upon existing theories. Soil Sci. **15:** 181–204. Mr 1923.

Nichols, G. E. A working basis for the ecological classification of plant communities. Ecology **4:** 11–23, 154–179. 1923.

Nordenskiold, E. Deductions suggested by the geographical distribution of some post-Columbian words used by the Indians of S. America. Pp. 1–176. Göteborg, Sweden. 1922.

Contains a chapter on "The introduction of the banana into S. America."

Oehlkers, F. Vererbungsversuche an Oenotheren II. Zeits. Indukt. Abstamm. u. Vererbungsl. **31:** 201–260. *f. 1–17.* 1923.

Olmsted, F. C., Coville, F. V., & Kelsey, H. P. Standardized plant names. Pp. i–xvi+1–546. Salem, Massachusetts. 1923.

"A catalogue of approved scientific and common names of plants in American commerce."

Oppenheimer, H. Keimungshemmende Substanzen in der Frucht von *Solanum Lycopersicum* und in anderen Pflanzen. Sitzungsber. Akad. Wissens. Wien **131**: 59–64. 1922.

Osterhout, W. J. V. Injury, recovery, and death, in relation to conductivity and permeability. Pp. 1–260. *f. 1–96.* Philadelphia. 1922.

Oudemans, C. A. J. A. Enumeratio systematica fungorum, vol. 4. Pp. i–xiv+1–1232. Hague, Netherlands. 1923.

Pammel, L. H. The species of *Rhamnus* in southwestern United States and the Pacific coast and *Puccinia coronata*. Proc. Iowa Acad. Sci. **29**: 267–270. 1922.

Pammel, L. H. Notes on the flora of Yosemite [California] and adjacent regions. Proc. Iowa Acad. Sci. **29**: 245–256. *f. 1–6.* 1922.

Pammel, L. H. Shrubs of the McGregor [Iowa] district. Proc. Iowa Acad. Sci. **28**: 268–272. 1921.

Pammel, L. H. Trees of the proposed Mississippi Valley National Park. Proc. Iowa Acad. Sci. **28**: 265–267. 1921.

Pammel, L. H., & King, C. M. Studies in the germination of some woody plants. Proc. Iowa Acad. Sci. **28**: 273–282. *f. 36–48.* 1921.

Pammel, L. H., & King, C. M. Germination studies of some shrubs and trees. Proc. Iowa Acad. Sci. **29**: 257–266. *f. 1–14.* 1922.

Parish, S. B. *Cleomella obtusifolia*, Torr. & Frem. Bull. S. California Acad. Sci. **22**: 12–14. Mr 1923.

Parodi, L. R. Algunas Gramineas mal conocidas o nuevas para la flora Argentina. Physis **6**: 101–104. 30 N 1922.

Parodi, L. R. Nuevas Gramineas para la flora Argentina. Physis **7**: 56–62. *f. 1–3.* 21 S 1923.

Payne, F. W. *Liostephania* and its allies. Pp. 1–30. *pl. 1–4.* London, England. 1922.

Pennell, F. W. Through the Andes of western Colombia. Ann. Rep. Acad. Nat. Sci. Philadelphia **1922:** 15–28. 1923. [Illust.]

Petrak, F. Mykologische Notizen V. Ann. Mycol. **21:** 1–69. 1923.

Petrak, F. Mykologische Notizen VI. Ann. Mycol. **21:** 182–335. 1923.

Includes *Brencklea*, gen. nov., from Dakota, and new species from Porto Rico in *Peroneutypa* (1), *Calosphaeria* (1), *Physalospora* (1), *Psiloglonium* (1), and *Patellaria* (1).

Petrak, F., & Sydow, H. Kritisch-systematische Originaluntersuchungen über Pyrenomyzeten, Sphaeropsideen und Melanconieen. Ann. Mycol. **21:** 349–384. 1923.

Includes *Rhynchostomopsis*, gen. nov., from Brazil.

Pfeiffer, N. E. Isoetaceae. In Abrams, L. R., An illustrated flora of the Pacific states **1:** 35–38. 1923. [Illust.]

Raeder, J. M. Study of the Phycomycetes of Iowa. Proc. Iowa Acad. Sci. **28:** 283–293. 1921.

Rawitscher, F. Epinastie und Geotropismus. Zeits. Bot. **15:** 65–100. *pl. 1.* 1923.

Reports experiments made with *Tradescantia*.

Reddy, C. S., & Godkin, J. A bacterial disease of brome-grass. Phytopathology **13:** 75–86. *pl. 1, 2.* 27 F 1923.

Reed, H. S. A note on the statistics of cyclic growth. Proc. Nat. Acad. Sci. **9:** 65–67. *f. 1.* 15 Mr 1923.

Reed, H. S., & Haas, A. R. C. Effect of sodium chloride and calcium chloride upon growth and composition of young orange trees. Univ. California Agr. Exper. Sta. Techn. Pap. **4:** 1–22. *pl. 1–6.* Ap 1923.

Riker, A. J. Some morphological responses of the host tissue to the crown-gall organism. Jour. Agr. Research **26:** 425–436. *pl. 1–6.* 1 D 1923.

Riley, L. A. M. Contributions to the flora of Sinaloa: I. Kew Bull. Misc. Inform. **1923:** 103–115. 1923.

Includes new species in *Halimium* (1), *Polygala* (1), *Anoda* (1), and *Triumfetta* (1).

Riley, L. A. M. Contributions to the flora of Sinaloa: II. Kew Bull. Misc. Inform. **1923:** 163–175. 1923.

Includes new species in *Bursera* (4) and *Rhamnus* (2).

Riley, L. A. M. Contributions to the flora of Sinaloa: III. Kew Bull. Misc. Inform. **1923:** 333–346. 1923.

Includes new species in *Crotalaria* (1), *Lupinus* (1), *Hosackia* (1), and *Tephrosia* (2).

Riley, L. A. M. Contributions to the flora of Sinaloa: IV. Kew Bull. Misc. Inform. **1923:** 388–401. 1923.

Includes new species in *Acacia* (1) and *Inga* (1).

Riley, [L. A. M.] *Aeschynomene bracteolaris* Riley. Kew Bull. Misc. Inform. **1923:** 115, 116. 1923.

New species from Mexico.

Riley, [L. A. M.] *Buchnera minor* Riley. Kew Bull. Misc. Inform. **1923:** 117. 1923.

Buchnera minor (Hemsley) Riley from Mexico.

Riley, [L. A. M.] *Vaccinium Gonzalezii* Riley. Kew Bull. Misc. Inform. **1923:** 116. 1923.

New species from Mexico.

Roberts, J. W. A bud-rot of the peach caused by a species of *Fusarium*. Jour. Agr. Research **26:** 507–512. *pl. 1 + f. 1.* 8 D 1923.

Rodriguez, L. Contribution a l'étude de la flore du Guatémala. Bull. Soc. Bot. France **69:** 814–818. 1923.

Roig, J. T. Reseña sobre una excursion botanica a Isla de Pinos. Mem. Soc. Cubana Hist. Nat. Poey **5:** 72–76. 1923.

Rosen, H. R. A bacterial disease of foxtail (*Chaetochloa lutescens*). Ann. Missouri Bot. Gard. **9:** 333–402. N 1922.

Rudolfs, W. Influence of temperature and initial weight of seeds upon the growth rate of *Phaseolus vulgaris* seedlings. Jour. Agr. Research **26:** 537–540. 15 D 1923.

Ruth, W. A. The effect of Bordeaux mixture upon the chlorophyll content of the primordial leaves of the common bean, *Phaseolus vulgaris* L. Am. Jour. Bot. **9:** 535–550. 1922.

Rydberg, P. A. Flora of the Rocky Mountains and adjacent plains. Ed. II. Pp. i–xii + 1–1143. New York. 1922.

Includes new species in *Celtis* (1), *Cartiera* (1), *Xylophacos* (1), *Homalobus* (1), and *Comandra* (1).

Rydberg, P. A. Galegeae (pars). N. Am. Fl. **24:** 155–200. 16 Jl 1923.

Includes new species in *Cracca* (13) and *Brongniartia* (8).

Samuelsson, G. Revision der sudamerikanischen Epilobium-arten. Svensk Bot. Tidskr. **17:** 241–296. 1923.

Includes 15 new species from South America.

Sartory, A., & Maire, L. Compendium Hymenomycetum. *Amanita*. Pp. 1–318. Paris, France. 1922–1923. [Illust.]

Sax, K. The association of size differences with seed-coat pattern and pigmentation in *Phaseolus vulgaris*. Genetics **8:** 552–560. N 1923.

Scala, A. C. Contribución al conocimiento histologico de la yerba-mate y sus falsificaciones. Rev. Mus. La Plata **26:** 69–165. *f. 1–142*. 1922.

Study of *Ilex paraguayensis*.

Schaffner, J. H. Additions to the catalog of Ohio vascular plants for 1922. Ohio Jour. Sci. **23:** 107–114. Ap 1923.

Schmidt, D. The relation of seed weight to the growth of buckwheat in culture solution. Soil Sci. **15:** 285–292. Ap 1923.

Schürhoff, P. N. Zur Apogamie von *Calycanthus*. Flora **116:** 73–84. 1923.

Scouvart, A. Les arbres géants de la Californie. Bull. Soc. Roy. Bot. Belgique **55:** 73–86. *pl. 2, 3*. 1923.

Shantz, H. L. The natural vegetation of the Great Plains region. Ann. Assoc. Am. Geog. **13:** 81–107. *pl. 3–8*. Je 1923.

Shimek, B. The genus *Ceanothus* L. in Iowa. Proc. Iowa Acad. Sci. **28:** 230–242. *pl. 8.* 1921.

Shimek, B. The use of common names for plants. Proc. Iowa Acad. Sci. **28:** 225–229. 1921.

Skottsberg, C. Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907–1909. IX. Marine Algae. 2. Rhodophyceae. Kungl. Svenska Vetensk. Handl. **63**[8]**:** 1–70. *f. 1–29.* 8 Mr 1923.

Includes *Dendrymenia*, *Microrhinus*, *Pseudophycodrys*, and *Anisocladella*, gen. nov., and new species in *Gracilaria* (1), *Delesseria* (1), *Phycodrys* (1), and *Platyclinia* (1).

Small, J. The wanderings of the groundsel [*Senecio vulgaris*]. Bot. Soc. & Exch. Club British Isles **6:** 781–785. 1923.

Treats of the ancestry of the Compositae.

Small, J. K. Land of the question mark. Jour. New York Bot. Gard. **24:** 1–23, 62–70. 1923.

"Report of exploration in Florida in December, 1920."

Souges, R. Recherches sur l'embryogénie des Solanacées. Bull. Soc. Bot. France **69:** 555–585. *f. 126–259.* 1923.

Spegazzini, C. Algunos hongos de Tierra del Fuego. Physis **7:** 7–23. 21 S 1923. [Illust.]

Includes *Dictyochaeta*, gen. nov., and new species in *Calospora* (1), *Zignoella* (1), *Acrospermum* (1), *Humaria* (1), *Helotium* (1), *Agyrium* (1), *Phacidium* (1), and *Dictyochaeta* (1).

Spegazzini, C. Algunas observaciones relativas al suborden de las Mimosoideas. Physis **6:** 308–315. 30 Ap 1923.

Includes *Manganaroa*, *Pithecodendron*, and *Anadenanthera*, gen. nov.

Spegazzini, C. Descripción de hongos mirmecofilos. Rev. Mus. La Plata **26:** 166–174. *f. 1–5.* 1922.

Includes new species in *Locellina* (1) and *Poroniopsis* (1).

Spegazzini, C. Fitoadénomas. Physis **6:** 325–327. *f. 1–3.* 30 Ap 1923.

Discusses nectaries on leaves of *Ipomoea fistulosa* Mart.

Spegazzini, C. Observaciones relativas a las espècies del género "Convolvulus" de los alrededores de la ciudad de La Plata. Physis **6:** 220–237. *pl. 1–7.* 30 Ap 1923.

Includes 2 new hybrids of *Convolvulus.*

Sprague, T. A. Notes on *Heliocarpus*. Kew Bull. Misc. Inform. **1923:** 348–351. 1923.
Includes 2 new species from Central America.

Sprague, [T. A.], & Riley, [L. A. M.] *Calliandra confusa* Sprague et Riley (Leguminosae-Ingeae). Kew Bull. Misc. Inform. **1923:** 371, 372. 1923.
New species from Guatemala.

Sprague, [T. A.] & Riley, [L. A. M.] *Calliandra similis* Sprague et Riley (Leguminoseae-Ingeae). Kew Bull. Misc. Inform. **1923:** 372, 373. 1923.
New species from Costa Rica.

Sprague, [T. A.] & Riley, [L. A. M.] *Piriqueta* (*Erblichia*) *xylocarpa* Sprague et Riley (Turneraceae). Kew Bull. Misc. Inform. **1923:** 373. 1923.
New species from British Honduras.

Staedtier, G. Über Reduktionserscheinungen im Bau der Antherenwand von Angiospermen-Blüten. Flora **116:** 85–108. 1923.

Standley, P. C. Trees and shrubs of Mexico (Oxalidaceae-Turneraceae). Contrib. U. S. Nat. Herb. **23:** 517–848 + I–XXVIII. 1923.
Includes *Orthosphenia* and *Calatola*, gen. nov., and new species in *Rutaceae* (1), *Euphorbiaceae* (3), *Aquifoliaceae* (1), *Celastraceae* (6), *Hippocrateaceae* (1), *Icacinaceae* (2), *Sapindaceae* (4), *Rhamnaceae* (6), *Vitaceae* (3), *Elaeocarpaceae* (1), *Malvaceae* (10), *Bombacaceae* (1), *Sterculiaceae* (6), *Ochnaceae* (1), *Cistaceae* (1), *Violaceae* (1), and *Flacourtiaceae* (3).

Standley, P. C. New species of plants from western Mexico. Jour. Washington Acad. Sci. **13:** 5–8. 4 Ja 1923.
New species in *Allionia* (1), *Caesalpinia* (1), *Amyris* (1), *Schaefferia* (1), *Bouvardia* (1), and *Chomelia* (1).

Stevens, O. A. An amateur wild flower bed. Am. Midl. Nat. **8:** 164–171. Ja 1923.

Stout, A. B. Alternation of sexes and intermittent production of fruit in the spider flower (*Cleome spinosa*). Am. Jour. Bot. **10:** 57–66. *pl. 6.* 2 Mr 1923.

Svedelius, N. Zur Kenntnis der Gattung *Neomeris*. Svensk Bot. Tidskr. **17:** 449–471. 1923.

Taubenhaus, J. J., & Killough, P. T. Texas root rot of cotton and methods of its control. Texas Agr. Exp. Sta. Bull. **307:** 1–98. *f. 1–15.* Ap 1923.

Thompson, B. E. Distribution of the Violaceae of Michigan. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 167–184. *pl. 35, 36.* F 1923.

Titcomb, J. W. Aquatic plants in pond culture. U. S. Bur. Fish. Docum. **948:** 1–24. *f. 1–32.* 1923.

Trinkgeld, R. Beiträge zur Morphologie der Vegetationsorgane der Cucurbitaceen. Flora **116:** 270–295. *pl. 5.* 1923.

Troll, K. Öffnung und Samenentleerung an nickenden Kapselfrüchten. Flora **116:** 346–359. *pl. 6.* 1923.

Tulaikov, N. M. The soil solution and its importance in the growth of plants. Soil Sci. **15:** 229–234. Ap 1923.

Ulbrich, E. Ueber die neuen, von *Ranunculus* zu trennenden Gattungen *Rhopalopodium, Aspidophyllum* und *Laccopetalum.* Verh. Bot. Ver. Brandenburg **64:** 192–196. 1922.

Uphof, J. C. T. Die Jugendform von *Hypericum aspalathoides.* Flora **116:** 312–315. *f. 1–3.* 1923.

Uphof, J. C. T. Vegetationsbilder aus Florida. Vegetationsbilder **15:** *pl. 13–24.* [With text.] 1923.

Urban, I. Ueber einige westindische Pflanzengattungen. Verh. Bot. Ver. Brandenburg **64:** 220–222. 1922.

Valleau, W. D. The inheritance of flower types and fertility in the strawberry. Am. Jour. Bot. **10:** 259–274. 10 My 1923.

Vizioli, J. Some Pyrenomycetes of Bermuda. Mycologia **15:** 107–119. *pl. 11.* 31 My 1923.

Vries, H. de. *Oenothera Lamarckiana* mut. *perennis.* Flora **116:** 336–345. 1923.

Vries, H. de. Über die Mutabilität von *Oenothera Lamarckiana* mut. *simplex.* Zeits. Indukt. Abstamm. u. Vererbungsl. **31:** 313–351. 1923.

Vries, H. de. Über sesquiplex-Mutanten von *Oenothera Lamarckiana*. Zeits. Bot. **15:** 369–408. 1923.

Vries, H. de, & Boedijn, K. On the distribution of mutant characters among the chromosomes of *Oenothera Lamarckiana*. Genetics **8:** 233–238. *f. 1.* My 1923.

Waby, J. F. *Chrysalidocarpus glaucescens* Waby (Palmae-Arecеae). Kew Bull. Misc. Inform. **1923:** 376. 1923.
New species from Trinidad.

Wakefield, F. W. A biometric study of the conidia of *Macrosporium* and *Alternaria*. Pap. & Proc. Roy. Soc. Tasmania **1922:** 27–31. 1923.

Walton, J. On the structure of a middle Cambrian Alga from British Columbia (*Marpolia spissa* Walcott). Proc. Cambridge Phil. Soc., Biol. Sci. **1:** 59–62. *pl. 5* + *f. 1.* Au 1923.

Weir, J. R. *Fomes roseus* (A. & S.) Cke. and *Trametes subrosea* nom. nov. Rhodora **25:** 214–220.

Werdermann, E. Über die Gattung *Teratonema* Syd. Ann. Mycol. **21:** 336–339. 1923.

Werkenthin, F. C. Description and key of the genus *Cucurbita*. Proc. Iowa Acad. Sci. **29:** 281–290. *f. 1–3.* 1922.

Werkenthin, F. C. The founders of the art of plant breeding. Proc. Iowa Acad. Sci. **29:** 291–310. 1922.

Whetzel, H. H. The *Alternaria* blight of potatoes in Bermuda. Phytopathology **13:** 100–103. *f. 1.* 27 F 1923.

Wilson, E. H. Travel tales of a plant collector—XII. The tropics of the new world. Mexico's gift of the gorgeous poinsettia—West Indian plants that make men dumb—a water flower from the Orinoco with leaves five feet by six. Gard. Mag. **38:** 355–359. "F" Ja 1924. [Illust.]

Wilson, B. D. The effect of plants on the concentration of drainage water from the Cornell lysimeters. Soil Sci. **16:** 427–432. D 1923.

Wright, C. H. Pita and silk grass. Kew Bull. Misc. Inform. **1923:** 266, 267. 1923.

Wylie, R. B. Concerning the capacity of foliage leaves to withstand wounding. Proc. Iowa Acad. Sci. **28:** 293–304. *f. 49–54.* 1921.

Wylie, R. B. Submarginal venation of foliage leaves. Proc. Iowa Acad. Sci. **29:** 233–237. *f. 1.* 1922.

Wylie, R. B. Some wound responses of foliage leaves. Proc. Iowa Acad. Sci. **29:** 238–244. *f. 1–6.* 1922.

Wylie, R. B., & Yocum, A. E. The endosperm of *Utricularia*. Univ. Iowa Stud. Nat. Hist. **10:** 3–18. *pl. 1–6.* 1 My 1923.

Yeager, A. F., & Heath, F. M. Perennial flowers for North Dakota homes. N. Dak. Agr. Exp. Sta. Bull. 170: 1–56. *f. 1–26.* D 1923.

Youngken, H. W. Animal-eating plants. Pop. Sci. Talks **1:** 136–157. *f. 1–11.* 1923.

Yuncker, T. G. The genus *Cuscuta* in Michigan. Pap. Michigan Acad. Sci., Arts & Lett. **1:** 185–189. F 1923.

Yuncker, T. G. Revision of the South American species of *Cuscuta*. Am. Jour. Bot. **9:** 557–575.

Inc'udes 6 new species.

Zimmermann, W. Zytologische Untersuchungen an *Sphacelaria fusca* Ag. Ein Beitrag zur Entwicklungsphysiologie der Zelk. Zeits. Bot. **15:** 113–175. *f. 1–7.* 1923.